



DRAFT

**Butte Resource
Management Plan
and
Environmental Impact Statement**

VOLUME II

June 2007



BLM

Butte Field Office



The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times. Management is based on the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation; rangelands; timber; minerals; watershed; fish and wildlife; wilderness; air; and scenic, scientific, and cultural values.

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BUTTE RESOURCE MANAGEMENT PLAN

AND

ENVIRONMENTAL IMPACT STATEMENT

BUTTE FIELD OFFICE

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CHAPTER 4

ENVIRONMENTAL CONSEQUENCES - CONTINUED

ENVIRONMENTAL CONSEQUENCES OF FIVE SITE- SPECIFIC TRAVEL PLANS

This section discusses effects of alternatives for five site-specific travel plans (implementation decisions). After a discussion of Analysis Assumptions, the section is organized by travel planning area such that all effects (including cumulative effects) are described for the various resources and resource uses contiguously for each specific travel planning area. Alternatives for the Helena, East Helena, Lewis and Clark County NW, Boulder/Jefferson City, and Upper Big Hole River Travel Planning Areas (TPAs) are discussed.

ANALYSIS ASSUMPTIONS

Travel Management and Access

- Designating roads as either “Open Yearlong,” “Open with Restrictions,” or “Closed Yearlong” would improve travel management and protection of natural resources.
- Comprehensive inventories of all existing routes would be used.
- Routes were considered non-motorized if they were existing trails, closed roads or decommissioned roads.
- Visitor-use and demand is likely to continue to increase for both motorized as well as non-motorized users.
- Demand for adequate public and agency access to public lands will remain high over the life of the plan.
- Changes in OHV and snowmobile design and technology will continue, enabling OHV users to travel into areas that were once thought of as inaccessible due to terrain and water or soil features.
- Analysis of the travel system only included routes documented during the inventory period.

Transportation Facilities

- Road maintenance will be conducted on routes designated as Open and Restricted.
- Annual road maintenance is estimated at \$400/mile for this analysis.
- Annual trail maintenance is estimated \$200/mile for this analysis and would only be performed on motorized trails.
- Periodic road stabilization is estimated at \$40/mile for this analysis.

- Periodic trail stabilization is estimated at \$20/mile for this analysis and would only be performed on motorized trails.
- Twenty percent of Open/Restricted routes will require annual maintenance.
- Eighty percent of Open/Restricted routes will require periodic maintenance.
- Monitoring/compliance costs are estimated at \$50/mile for this analysis.
- Weed control is estimated for this analysis at 2.5 acres of spraying/mile of road at \$15/mile.

Soil Resources

- BLM roads will continue to be maintained, with priority placed on those most heavily used by the public.
- State and major county roads will continue to be maintained to current levels and generally, county roads will not be abandoned. BLM facilities, mainly roads, will continue to be maintained, with priority placed on those most heavily used by the public.
- Natural process assumptions include: roads in the Butte Field Office will continue to erode from natural causes, increased vegetative cover would lead to reduced soil erosion, and removal of conifer encroachment could minimize accelerated soil erosion.

Water Resources

- Natural process assumptions include: roads in the Butte Field Office will continue to erode from natural causes resulting in potential impacts on water quality in adjacent streams, increased vegetative cover will lead to reduced soil erosion and in certain instances reduced deposition of sediments into streams, and removal of conifer encroachment could result in an increased quantity of water.

HELENA TPA

The Helena TPA area contains 10,162 acres of BLM lands within the 95,492-acre TPA. The majority of lands in the TPA are privately owned (56,499 acres) with USFS lands making up a substantial portion as well (23,911 acres). The approximately 52.2 miles of BLM roads make up about 7.5 percent of the approximate total of 694 road miles in the entire TPA. Most roads (528 miles) are on private lands.

SOILS

Effects Common to All Alternatives

Road construction, use, and maintenance affect soils in a number of ways. Soils are often compacted by these activities. Soil compaction can lessen the amount of precipitation that can infiltrate into soil and increase runoff, erosion, and sedimentation – in turn decreasing soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.

Ground disturbance associated with road construction, use, and maintenance can result in erosion. Erosion affects soil/site stability and hydrologic function. Erosion and sedimentation can destabilize the surface and subsurface cohesion of the soil, resulting in soil loss from erosion sites. Loss of soil can impede or prevent establishment and development of vegetation communities.

Closing or decommissioning roads often leads to beneficial effects to soils through decreased site disturbance and re-establishment of vegetative cover on road surfaces. This tends to reduce soil erosion and stabilize soils. Decommissioning roads may in some cases entail ripping road surfaces to de-compact them, thus improving water infiltration, hydrologic function, and the ability of the treated area to revegetate more successfully.

Impacts to soils associated with site-specific travel plan alternatives were assessed based on the potential for soil erosion using the following erosion risk criteria:

- High – the area a route travels through has slopes greater than 30 percent gradient.
- Moderate – the area a route travels through has slopes ranging from 15 to 30 percent gradient; or,

for granitic soils, slopes ranging from 0 to 30 percent gradient.

- Low – the area a route travels through has slopes ranging from zero to 15 percent gradient and soils are not granitic in origin.
- Unrated – road mapping not available at time of erosion impact rating.

Effects of the Alternatives

The distribution of road miles by erosion impact category and by proposed road management category for all the alternatives is shown for the Helena TPA in . Roads in the “unrated” category were excluded from detailed consideration and are provided for the purpose of displaying the extent of lacking information.

Under current conditions (Alternative A) approximately 11.8 miles of open BLM roads are located in areas with high erosion risk, and 34.3 miles are in moderate erosion areas. Soil erosion would be reduced under Alternative B because this alternative would reduce those open road mileages in high and moderate erosion categories to 4.4 miles and 7.4 miles, respectively. Approximately 28.2 miles of road in the high and moderate classes would be closed under Alternative B with an additional 6.6 miles in these categories being decommissioned. Vegetative recovery should occur on closed and decommissioned roads, with a beneficial effect on soils of reducing erosion from these areas.

Soil erosion would be most reduced under Alternative C because the lowest mileage of roads in the high and moderate erosion categories would be left open (6.1 miles combined), while the greatest mileage in these categories would be closed (35.8 miles combined) of all alternatives. An additional 4.3 miles in these categories would be decommissioned under Alternative C.

Soil erosion associated with roads would be reduced

Table 4-48
BLM Road Miles in Soil Erosion Impact Categories by Alternative for the Helena TPA
(mileages are GIS-generated estimates)

Proposed Road Management	Erosion Risk Category	Alternative A	Alternative B	Alternative C	Alternative D
Open Road Miles (including Open w/restrictions)	High	11.8	4.4	2.1	6.3
	Moderate	34.3	7.4	4.0	13.4
	Low	3.5	0.9	0.8	0.8
	Unrated	2.6	1.0	0.1	0.8
Closed Road Miles	High	0	4.5	8.1	5.4
	Moderate	0	23.7	27.7	17.7
	Low	0	2.2	2.3	2.3
	Unrated	0	1.7	2.6	2.2
Decommissioned Road Miles	High	0	3.0	1.7	0.2
	Moderate	0	3.2	2.6	2.6
	Low	0	0.4	0.4	0.4
	Unrated	0	0	0	0

Note: Open roads include seasonally open roads as well as roads open yearlong.

under Alternative D compared to Alternative A, but would still be higher than under either Alternative B or C. Approximately 19.7 miles of BLM road in the moderate and high erosion categories combined would remain open under Alternative D, while about 23.1 miles in these categories would be closed and 2.8 miles would be decommissioned under this alternative.

Cumulative Effects on Soils

Under all alternatives, cumulative effects to soils in the East Helena TPA would arise from a number of past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 95,492-acre TPA, BLM lands comprise about 10,162 acres or 11 percent of total lands. The approximately 52 miles of BLM roads (under Alternative A) make up about 7.5 percent of the approximately 693 road miles in the TPA. Therefore road-related effects to soils described by alternative for BLM roads would affect about 7.5 percent of all roads in the TPA. The majority of lands and roads within the TPA boundary are private property. Non-BLM roads are managed by the county, Forest Service, state, and private landowners.

Approximately 8,000 acres of land in the Helena TPA are managed by the National Guard. In addition to having and using various barracks and classrooms present, the Guard conducts various military maneuvers and training on these lands including non-live fire training and off-road use of military vehicles. Some helicopter-based training also occurs here including landings to drop off soldiers. Some soil erosion and compaction as well as loss of vegetative ground cover further exacerbating soil effects occur here, but to an unknown degree.

Approximately 481 BLM acres are permitted for various rights-of-way and leases. About 359 of these acres are for specific road rights-of-way. The remaining 122 acres are associated with power lines, waterlines, communication sites, oil and gas pipelines, and other utility facilities.

Impacts to soils range from compaction and occupation of ground with buildings, roadbeds, and other facilities, to revegetation and ground cover being re-established to stabilize soils.

Selective timber harvest has occurred on about 133 acres of BLM land in the TPA since 1995. Adverse effects on soils were minor with treated areas having undergone revegetation and soil stabilization since treatment. Timber harvest has also occurred on private and Forest Service lands, will likely continue, and will likely have localized impacts on soils for the foreseeable future.

From 1981 to 2004, wildland fire has burned across 65 acres in the Helena TPA, having a mosaic of soil effects with more severely burned areas experiencing localized erosion while many areas were relatively little affected.

There has been one fuels reduction treatment on BLM lands in the TPA in the last 10 years. Approximately 150 acres in the Scratchgravel Hills around the Wildland Urban Interface had hazardous fuels mechanically removed and ground up on site. Effects to soils from this project were negligible. Within the next several years, BLM anticipates additional fuels treatments on 1,500 to 2,500 acres of WUI areas in the Scratchgravel Hills. These treatments would consist of a combination of mechanical and prescribed fire treatments and would generally have minor effects on soils. Prescribed burning would occur under conditions where fire severity and intensity would be low, thereby minimizing potential damage to soil or desired vegetation. All treatments would minimize compaction so as to promote vegetative recovery. Fuels treatments conducted on private and Forest Service lands will also likely occur for the foreseeable future with variable effects to soils. Reducing fuels under the controlled conditions of deliberate treatments may benefit soils in the long-term by reducing the risk of high severity fires in treated areas.

Livestock grazing on BLM lands, other public and private lands throughout much of the TPA has created areas of localized soil erosion and compaction. This will continue to occur for the foreseeable future.

Increasing residential development will likely continue for the foreseeable future to variable degrees within the TPA. Erosion, compaction, and covering of soils would occur due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments.

Under Alternative A, the contribution to cumulative effects on soils from BLM road management would continue as it occurs today. Retaining approximately 52 miles of road open yearlong would allow for the same level of compaction and erosion impacts that currently exist.

From a BLM road management perspective, all action alternatives would benefit soil resources compared to Alternative A. Alternative B would benefit soils by providing for a reduced contribution to adverse cumulative effects than would Alternative A because about 73 percent of BLM roads would be closed or decommissioned under Alternative B (compared to all being open yearlong under Alternative A). Erosion should be reduced on these closed/decommissioned roads as disturbance is eliminated and revegetation occurs and stabilizes soils.

Alternative C would benefit soils the most and provide for the least contribution to adverse cumulative effects on soils of all alternatives. This alternative would provide for closure or decommissioning of about 86 percent of BLM roads in the TPA, thus allowing these areas to vegetatively recover and stabilize soils.

Alternative D would provide for the greatest contribution to adverse cumulative effects on soils of the action alternatives, but would still provide for greater long-term benefits to soils than Alternative A. Alternative D would provide for closure or decommissioning (and therefore vegetative recovery and/or soil stabilization) of about 58 percent of BLM roads in the TPA, compared to 73 percent for Alternative B, and 86 percent for Alternative C.

Due to the scattered distribution and relatively small proportion of BLM lands (11 percent) and roads (7.5 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects to soils at the scale of the entire Helena TPA.

WATER RESOURCES

Effects Common to All Alternatives

Hydrologic function is an interaction between soil, water, and vegetation, and reflects the capacity of a site to:

- Capture, store, and safely release water from rainfall, runoff, and snowmelt;
- Resist a reduction in this capacity; and
- Recover this capacity following degradation.

Interception of precipitation results when precipitation falls on vegetation. When vegetation is removed, precipitation falls directly on the soil. This can increase surface erosion and sedimentation, and decrease the amount of time between initial precipitation arrival and peak surface runoff – in turn decreasing soil/site stability and hydrologic function. Roads remove vegetation and therefore decrease interception of precipitation.

Infiltration is the process of precipitation entering and traveling through soil. Infiltration reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. Infiltration also filters precipitation and reduces erosion and sedimentation. If infiltration is reduced, runoff and erosion will increase and hydrologic function will decrease. Generally, roads are compacted surfaces that have decreased infiltration, thus increasing runoff and potentially increasing erosion.

Runoff can affect the amount of erosion and sedimentation, as well as flooding – both onsite and offsite. If runoff is increased, all of these effects can increase with a result that water quality and hydrologic function will decrease.

Increased sediment entering water bodies increases turbidity; increases width-to-depth ratios, and consequently increases temperature and dissolved oxygen saturation levels; and creates adverse habitat for aquatic animals and plants.

Alteration of flow routing can also affect water resources. For example, roadcuts into areas with relatively shallow groundwater can intercept groundwater, bring it to the surface, and transport it some distance (i.e. in a roadside ditch) before delivering it to a stream. This can lead to erosion of road ditchlines and subsequent sedimentation of streams during runoff periods, or increased thermal loading of water before delivery to streams during summer periods.

Closure and decommissioning of roads tend to reduce erosion and sedimentation effects stemming from roads on water quality. On an equivalent road mile basis, decommissioning roads would benefit water quality to a greater degree than closing roads because the decommissioning process would often entail implementing measures to restore hydrologic function. During road decommissioning, items such as compaction, drainage, stream crossing culverts, and ground cover are often addressed in a manner that markedly improves hydrologic function. These features are not fully addressed on roads that are merely “closed”. However, because surface disturbance is reduced on newly closed roads, and because vegetation tends to re-establish ground cover on them, erosion and subsequent sedimentation effects to water quality are often reduced from closed roads.

Effects of the Alternatives

Generally, road density is an indicator of overall watershed health and function. Watersheds with higher road densities tend to have lower water quality due to greater disruption of hydrologic function (described above), and potential for erosion and subsequent sedimentation. Road density also is related to the distribution and spread of noxious weeds. **Table 4-49** shows acres of BLM land in three road density categories by alternative for the Helena TPA. These data reflect differences between alternatives based on roads proposed for “decommissioning” by alternative. While many “closed” roads would gradually contribute to increased hydrologic function over time, decommissioned roads would more directly contribute to hydrologic function because restoring hydrologic function would likely be part of the treatment during decommissioning. Alternative A would have the greatest amount of BLM land with “high” road densities of greater than 2 mi/mi². Alternative B would have the lowest acreage in the high category with the greatest acreage in the moderate category of all alternatives. Alternative C would have the next lowest acreage in the high road density category while Alternative D would have more acres in the high category than either Alternative B or C, but less than Alternative A. Overall, all the action alternatives would improve hydrologic function but by this measure Alternative B would make the greatest contribution to improved hydrologic function of all the alternatives.

Table 4-49 Acres of BLM Land in Road Density Categories by Alternative for the Helena TPA			
TPA Alternative	Road Density Category		
	Low (<1 mi/mi²)	Moderate (1 to 2 mi/mi²)	High (> 2 mi/mi²)
A	461	1,446	8,294
B	461	1,623	8,117
C	461	1,539	8,200
D	461	1,484	8,258

Motorized routes within 300 feet of streams generally have greater potential to directly impact water quality through erosion and sedimentation, increased water temperatures (due to loss of shading vegetation), and direct alteration of stream channel morphology than those farther away. **Table 4-50** shows the miles of open and closed roads on BLM lands within 300 feet of streams by alternative. Under Alternative A there are about 7 miles of open road within 300 feet of streams. All action alternatives would improve water quality by closing or decommissioning roads in close proximity to perennial streams. Alternatives B and C would create the most benefit as both would close or decommission 4.1 of the seven total miles of road within 300 feet of streams. Alternative D would have slightly less benefit by closing or decommissioning 2.5 of these 7 miles.

Cumulative Effects on Water Resources

Cumulative effects to water resources in the East Helena TPA would arise from a number of past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 95,492-acre TPA, BLM lands comprise about 10,162 acres or 11 percent of total lands. The approximately 52 miles of BLM roads (Alternative A) make up about 7.5 percent of the approximately 693 road miles in the TPA. Therefore road-related effects to water resources described by alternative for BLM roads would pertain to about 7.5 percent of all roads in the TPA. Within the entire TPA (all land ownerships) there are approximately 108 miles of perennial streams, including 37 miles of fish bearing streams. Of these, approximately 8 miles (including 2 miles of fish bearing) flow through BLM lands. The

majority of lands and roads within the TPA boundary are private property. Non-BLM roads are managed by the county, Forest Service, state, and private landowners.

Some of the main access roads (non-BLM) follow valley bottoms and parallel streams. Many of these roads are directly affecting stream channel and floodplain function by filling or impinging on active stream channels or floodplains, precluding the presence of riparian vegetation (including large woody material in forested locations), producing sedimentation in streams (from road surfaces, ditchlines, winter "road sanding" operations), and promoting thermal loading by lessening streamside shade.

Approximately 8,000 acres of land in the Helena TPA are managed by the National Guard. In addition to having and using various barracks and classrooms present, the Guard conducts various military maneuvers and training on these lands including non-live fire training and off-road use of military vehicles. Some helicopter-based training also occurs here including landings to drop off soldiers. Some soil erosion and compaction as well as loss of vegetative ground cover occur here. This is exacerbating potential erosion and sedimentation effects, but to an unknown degree. Sevenmile Creek, one of the streams listed as impaired by Montana Department of Environmental Quality on the 303(d) list flows through these lands.

Approximately 481 BLM acres are permitted for various rights-of-way and leases. About 359 of these acres are for specific road rights-of-way. The remaining 122 acres are associated with powerlines, waterlines, communication sites, oil and gas pipelines, and other utility facilities. Impacts to water resources are generally minor with some localized erosion and sedimentation emanating from areas of ground disturbance.

Selective timber harvest has occurred on about 133 acres of BLM land in the TPA since 1995. Adverse effects on water resources were minor with treated areas having undergone revegetation to minimize erosion. Timber harvest has also occurred on private and Forest Service lands and will likely continue. This activity will have localized sedimentation and possibly increased runoff effects associated with compaction for the foreseeable future.

Table 4-50 Miles of Open and Closed Roads on BLM Lands within 300 ft. of Fish-Bearing Streams and Perennial, Non-Fish-Bearing Streams by Alternative for the Helena TPA				
	Perennial Fish-Bearing Streams		Perennial Non-Fish-Bearing Streams	
	# Open Road Miles	# Closed Road Miles	# Open Road Miles	# Closed Road Miles
Alt. A	1.7	0	5.3	0
Alt. B	1.7	0	1.2	4.1
Alt. C	1.7	0	1.2	4.1
Alt. D	1.7	0	2.8	2.5

Note: Open roads include seasonally open roads as well as roads open yearlong. Closed roads include decommissioned roads.

From 1981 to 2004, wildland fire has burned across 65 acres in the Helena TPA, having minimal effects in streams.

There has been one fuels reduction treatment on BLM lands in the TPA in the last 10 years. Approximately 150 acres in the Scratchgravel Hills around the Wildland Urban Interface had hazardous fuels mechanically removed and ground up on site. Effects to water resources from this project were negligible as site-specific ground disturbance was minor and there are no streams in this portion of the TPA. Within the next several years, BLM anticipates additional fuels treatments on 1,500 to 2,500 acres of WUI areas in the Scratchgravel Hills. These treatments would consist of a combination of mechanical and prescribed fire treatments and would likely have minor effects on water resources. Prescribed burning would occur under conditions where fire severity and intensity would be low so as not to scorch soils and facilitate severe erosion. All treatments would minimize compaction so as to promote vegetative recovery and retain hydrologic function. There are no perennial streams in the area where this project is being planned so effects to water resources are expected to be minor to negligible.

Fuels treatments conducted on private and Forest Service lands will also likely occur for the foreseeable future with variable effects to water quality. Reducing fuels under the controlled conditions of deliberate treatments may benefit water quality in the long-term by reducing the risk of high severity fires in treated areas.

Livestock grazing on BLM land, other public and private lands throughout much of the TPA has created areas of localized streambank trampling, soil erosion and compaction, and nutrient inputs to streams. In severe cases stream channel morphology may be altered due to severe loss of riparian vegetation, loss of streambank integrity, channel widening and shallowing, and substantial sediment inputs. These effects to water quality will continue to occur for the foreseeable future. Agricultural water withdrawals occur on private lands in this TPA. These withdrawals reduce stream flows in the TPA, notably in Sevenmile Creek (listed as impaired water body by MDEQ on the 303(d) list).

Increasing residential development will likely continue for the foreseeable future to variable degrees within the TPA. Impairments to hydrologic function such as erosion, soil compaction, and runoff would likely increase due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments. Nutrient, chemical pollutant, and pathogen inputs to streams would also likely increase due to leaching from septic systems, urban runoff (fertilizer, chemicals, and petroleum pollutants), and waste from livestock.

Under Alternative A, the contribution to cumulative effects on water quality from BLM road management

would continue as it occurs today. Retaining approximately 52 miles of road open yearlong would allow for the same level of effects to water resources that currently exist.

From a BLM road management perspective, all action alternatives would benefit water resources compared to Alternative A. Alternative B would benefit water quality by providing for a reduced contribution to adverse cumulative effects from BLM roads compared to Alternative A because about 73 percent of BLM roads would be closed or decommissioned under Alternative B (compared to all being open yearlong under Alternative A). Alternative B would provide for decommissioning the greatest road mileage (6.5 miles) of all alternatives. Erosion and sedimentation should be reduced on these closed/decommissioned roads as disturbance is eliminated and vegetation becomes re-established on roadbeds. On an equivalent road mile basis, decommissioning roads would benefit water quality to a greater degree than closing roads because the decommissioning process would often entail implementing measures to restore hydrologic function.

Alternative C would reduce the contribution to adverse cumulative effects from BLM roads (and benefit water resources) to a similar degree as Alternative B although there are some differences between the two alternatives. Alternative C would provide for the most closed roads (40.7 miles compared to 32.1 under Alternative B) of all alternatives, but only the second most decommissioned roads (4.6 miles).

Alternative D would provide for the greatest continuing contribution to adverse cumulative effects on water resources of the action alternatives, but would still provide for greater long-term benefits to water resources than Alternative A. Alternative D would provide for closure (27.7 miles) or decommissioning (3.1 miles) of about 58 percent of BLM roads in the TPA, compared to 73 percent for Alternative B, and 86 percent for Alternative C.

Due to the scattered distribution and relatively small proportion of BLM lands (11 percent) and roads (7.5 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on water resources at the scale of the entire Helena TPA.

VEGETATIVE COMMUNITIES – FOREST RESOURCES AND FOREST AND WOODLAND PRODUCTS

Effects of the Alternatives

Under all alternatives, existing roads and roads built to access timber and forest product sales on BLM lands may encourage timber harvest and forest product sales on adjacent lands, particularly where landowners and other agencies are looking to improve economic

efficiency or opportunities in the management on their lands.

In general, vegetative treatment contractors tend to bid more readily on projects in areas with vehicle access or valuable forest products. BLM often prioritizes forest vegetation management activities such as forest products and forest protection activities (e.g. wildfire suppression and forest insect and disease control) in similar areas.

Rehabilitation of roads (decommissioning or in some cases road closure) would revegetate currently unvegetated roadbeds, which would increase vegetation biomass production on the landscape through colonization of sites with grasses, forbs, shrubs, and trees. Increases in revegetated area would occur at a rate of approximately 1.5 to 3 acres per mile of rehabilitated road. Eventually rehabilitated roads would support plant communities consistent with site potentials which would help resist weed invasions. However, road closures and removals (decommissioning) could make vegetation management treatments more difficult and costly, thereby inhibiting proposed treatments, reducing public access for forest product use and removal, and potentially slowing fire detection and suppression.

Under Alternatives A (52.2 open road miles) and D (21.9 open road miles) in the Helena TPA, the major vehicle access roads in the forest and woodland areas remain open, so there would be little increase in project analysis and implementation costs, and no change in the feasibility of vegetative and fuels reduction treatments. Under Alternatives B (13.6 open road miles) and C (seven open road miles), the access roads into the forest and woodland areas would be closed, so there could be a reduction in the feasibility of many projects. For projects that are feasible, there could also be increases in vegetative analysis, project planning, and treatment costs to the BLM.

In the context of gathering firewood and other forest products by the general public, mileage of open roads would represent the relative extent of public opportunities by alternative. For the Helena TPA, Alternative A would retain the most public opportunities for these activities, followed in sequence by Alternative D, Alternative B, than Alternative C.

Cumulative Effects on Forest and Woodland Resources and Products

No BLM forest health/silvicultural treatments or resource product removal projects are currently imminent in this TPA within the next five years. Fuels reduction projects with forest health considerations have a high priority because of the high degree of residential development surrounding BLM lands. The major block of land that includes BLM forest and woodlands in this TPA is located in the Scratchgravel Hills, with some woodland stands in a block located northwest of Fort Harrison near Austin. One fuels reduction project

(anticipated at 1,500 to 2,000 acres) is currently being planned in the Scratchgravel Hills area. These stands are of low productivity and commercial value, so the forest products generated would provide little revenue in timber sale projects. In other vegetation manipulation projects, derived products would provide only small offsets to costs for stewardship (exchange of goods for services) projects.

Forested vegetation on BLM lands would also be affected by approximately 481 acres of rights-of-way and leases on BLM land. Forested vegetation located in these areas usually is harvested and/or removed to accommodate the necessary access or facilities. Forest vegetation removal would occur on new authorizations in the future and would occur as necessary to maintain sight distances and safety clearances associated with roads and facilities.

Urbanization is expected to continue on the 56,499 acres of private lands within this TPA. Forest products are commonly removed from these areas prior to permanent construction. Urbanization is likely to continue in the future and will affect forested vegetation at an unknown rate. As private construction increases, miles of road on private land will most likely increase from the current 528 miles.

Risk to forests from human-caused wildfires is commonly associated with miles of open roads because increased fire starts occur in these areas. Risk to forests from wildfire on BLM lands would be greatest under Alternative A with 52.2 miles of open road. Alternative B would have less risk of human-caused fire starts with 13.6 miles of open road. Alternative C would have the least risk to forests of all alternatives with only 7.0 miles of road open during summer months. Alternative D (21.9 miles) would have less risk than Alternative A but more risk than either Alternative B or C. Given that the majority of roads in the TPA (92 percent) are non-BLM roads, this contribution to reduced fire risk from BLM roads in the action alternatives is relatively small in the context of the entire TPA.

Since BLM roads constitute only 7.5 percent of all roads in this TPA, and BLM lands make up only 11 percent of all lands in the TPA, urbanization and activities on open non-BLM roads in the vicinity may have more cumulative effects on forested vegetation in the TPA than BLM decisions regarding miles of open and closed road.

VEGETATIVE COMMUNITIES – NOXIOUS WEEDS

Under all alternatives, any snowmobile use would have negligible effects on noxious weed spread. Invasive noxious weeds and non-native species are degrading wildland health. These aggressive plants can outcompete many native plants, as they have few natural enemies to keep them from dominating an ecosystem. These plant

species are spread by many means. However, any land disturbing activity in the TPA has the most potential to introduce and spread weed species. Motorized vehicles are one vector for noxious weed spread as weed seed becomes attached to vehicles and their tires, and are transported from one area to another where seeds become detached and germinate to inhabit new areas.

Effects of Alternative A

Under Alternative A, all existing routes in the Helena TPA would continue to be open yearlong (52.2 miles open yearlong, zero miles seasonally restricted and closed) to wheeled motorized users. Cross-country snowmobile travel would continue to be allowed as well as travel on all routes. Under Alternative A the open BLM roads would represent about 7.5 percent of all open roads in the Helena TPA.

Alternative A would have the most roads open and in turn would promote the greatest amount of weeds and other undesirable plant spread and production of all alternatives. More herbicide control would be needed to control weeds under Alternative A than under the other alternatives.

Effects of Alternative B

Under Alternative B wheeled motorized travel (13.6 miles open yearlong) would be restricted to four areas in the Scratchgravel Hills: routes leading to five non-motorized trailheads; a short out-and-back route off of Norris Road; a loop route between Head Lane and Echo Lane; and all existing public access rights-of-way. Roads in these four areas would be open yearlong. Cross-country snowmobile use would be allowed, as well as snowmobile travel on all existing routes during the season of use (12/2-5/15), conditions permitting. Under Alternative B, 32.1 miles of BLM road would be closed, leaving 13.6 miles open yearlong as compared to 52.2 miles of road open yearlong under Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase spread on the open routes because of the more concentrated use of these routes. Overall Alternative B would reduce weed spread, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. Under Alternative B, the 13.6 miles of open BLM road would constitute about 2 percent of all open roads in the Helena TPA.

Effects of Alternative C

Alternative C would restrict wheeled motorized travel to five non-motorized trailheads in the Scratchgravel Hills. This alternative would provide the least number of wheeled motorized routes in the Helena TPA (7.0 miles open yearlong). Under this alternative, no snowmobile use would be allowed, including at the trailhead access routes. Under Alternative C, 40.7 miles of BLM road would be closed, leaving 7.0 miles open yearlong as

compared to 52.2 miles of road open yearlong under Alternative A and 13.6 miles open under Alternative B. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase spread on the open routes because of the more concentrated use of these routes. Overall Alternative C would reduce weed spread more than any other alternative, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. Under Alternative C, the 7 miles of open BLM road would make up about 1 percent of all open roads in the Helena TPA.

Effects of Alternative D

Under Alternative D, 21.9 miles of open routes would be available yearlong for wheeled motorized use. Of the action alternatives, Alternative D would provide the greatest opportunities for motorized users, and the least for non-motorized users. Cross-country snowmobile use would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), snow conditions permitting. This alternative would close 27.7 miles of road leaving 21.9 miles open yearlong as compared to 52.2 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase spread on the open routes because of the more concentrated use of these routes. Overall Alternative D would reduce weed spread more than Alternative A but less than Alternatives B and C, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. Under Alternative D, the 21.9 miles of open BLM road would make up about 3 percent of all open roads in the Helena TPA.

Cumulative Effects on Noxious Weeds

Under all alternatives, other past, present, and reasonably foreseeable future BLM and non-BLM actions and outside influences affect noxious weeds.

Recreation use is well established in the TPA. Primary recreation activities include motorized OHV uses (ATV, motorcycle) and non-motorized uses (hiking, jogging, horseback riding, mountain biking, etc.). Motorized recreation uses are one of the leading causes of introduction and spread of noxious weeds and non native species. Weed seeds are transported by many recreational vectors (i.e. motorized vehicles including their tires), non-motorized vehicles including their tires, pack animals, and humans.

Urban development may lead to an increase in right-of-way permits on public lands to accommodate private property/development access. As a result, soil disturbing activities (i.e. roads, powerlines, telephone lines, etc.), will increase causing weeds to increase.

A variety of resource management projects, such as BLM initiated vegetation treatments, or fuels reduction projects, could affect weeds in the TPA. The

Scratchgravel Hills Fuel Treatment Project is proposed in this TPA. It will consist of mechanical and/or prescribed fire treatments on from 1,500 to 2,500 acres focused on the urban interface areas. There has been a fuels treatment project completed in the Scratchgravel Hills in the last 5 years which consisted of reducing fuels on a 150 acre area. Any project creating soil disturbance has the capability to increase weedy plant species. Prescribed burning projects give the ground surface a fertilization effect and eliminate some plant competition for weedy species giving them a niche for establishment and expansion in some areas. Ground disturbing equipment could also transport noxious weed seed to these project sites. BLM implements weed control measures in the aftermath of such ground-disturbing activity so as to minimize noxious weed spread.

Wildland fires create good seed beds and supply nutrients for weed species introduction and production. From 1981 to 2004 there have been 14 wildland fires that have burned about 65 acres. This TPA contains sufficient fuel to support a wildland fire in the foreseeable future.

Mining is a land disturbing activity and the activity itself and weed seed contaminated equipment that is used could promote weeds in the area. There are a number of active claims in the TPA but relatively little ground-disturbing activity associated with them is taking place at this time.

Noxious weeds and non-native invasive species are well established and spreading in the area. Weed control activities by BLM and other entities, while often effective at reducing or minimizing weed spread and weed populations, can also lead to some weed spread. Herbicide spray equipment is driven through weed infestations and weed seeds as well as other weed vegetative parts are spread to other lands during and following treatment. Herbicide and biological control treatments in recent years have been accomplished on approximately 30 to 40 acres in the Scratchgravel Hills area. These weed treatments have varying success in killing undesirable plants, depending on many environmental parameters. The weeds that have been treated are primarily in the urban interface area where heavy motorized use plays a large role in the distribution of noxious weeds.

Timber sales have built in stipulations for mitigating weed production and spread. However, with ground disturbance the potential exists for weed introduction to occur on these sites. Vehicular access for tree plantings could contribute to the spread of existing weeds on site. Since 1984, there has been 10 acres of forest planting. From 1995 to the present there has been 133 acres of timber harvest in the TPA. Herbicide treatment of existing weeds was coordinated with tree seedling planting locations and timing so as to minimize potential exacerbation of weed spread. Reclamation associated

with abandoned mine lands has led to some spread of weeds. Herbicide control treatments have followed these reclamation actions to minimize or eliminate impacts.

Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, the Scratchgravel Hills could experience increased use from displaced users, and such use could cause a larger than anticipated introduction and spread of weeds. An increase in weeds would lead to an increase in needed treatment on BLM lands.

The National Guard manages approximately 8,000 acres of land (Fort Harrison) in the Helena area. These actions could potentially increase weed spread and production on (and off) BLM managed lands.

Portions of the TPA provide winter range for mule deer and elk. The Birdseye section is within a wildlife movement corridor that provides a connection between the Northern Continental Divide Ecosystem and the Greater Yellowstone Ecosystem, as well as local daily movements and seasonal movements between higher elevation summer ranges. Noxious weed seed are transported and spread by wildlife through their digestive systems and by attaching to the animals themselves and then being released at a later time.

Livestock grazing on and off BLM lands also contributes to weed spread either through seed being introduced by livestock themselves, or through vehicular uses needed to manage grazing operations.

Like much of the West, the Helena Valley has been experiencing steady human population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. The increasing population in the Helena area will in turn lead to an increase in use of this TPA creating more opportunities for weed spread and production.

The majority of BLM managed routes for the Helena Travel Planning area are located in or adjacent to the Scratchgravel Hills and Birdseye area. Scratchgravel Hills is basically an island of undeveloped hills surrounded by residential development (there is some internal development as well). Residential development has tripled from 300 residential homes in 1984 to over 1,000 homes today. Additional development is ongoing. This development/increase in human population has lead to an increase in use of the Scratchgravel Hills area by residents living adjacent to or within this area which in turn leads to an increase in weed spread and propagation.

Only 7.5 percent of all the travel routes in the Helena TPA are located on BLM managed lands (under Alternative A). Lands near roads and away from roads in the TPA are infested with weeds. The travel on all roads in the TPA is spreading weeds and weeds off these roads

are being spread by the weed plants themselves and other natural means. Because the majority of roads (92 percent) and lands (89 percent) in the TPA are non-BLM, activities in these areas play a stronger role than activities on BLM lands in determining the status of weed spread and weed populations in the TPA overall.

VEGETATIVE COMMUNITIES – RIPARIAN VEGETATION

Effects Common to All Alternatives

This section focuses on effects to riparian vegetation. For additional discussion of effects to water quality and stream channels, see the Water Resources and Fish sections.

Roads in riparian areas constitute ground disturbance that can eliminate or preclude presence of native riparian vegetation. This ground disturbance and loss of riparian vegetation may facilitate erosion and sedimentation of streams. Roads may also interfere with natural stream channel functions by occupying floodplains or active stream channel margins (see Water Resources section for more discussion). Noxious weeds may dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation. Noxious weed seed can be spread into riparian areas by motor vehicles via open roads. Closure of roads and trails can improve or maintain riparian condition by reducing avenues of noxious weed spread, as well as allowing for bare area re-vegetation which filters sediment in addition to stabilizing banks in some areas. Road and trail restrictions have the same effects but to a lesser degree, because some traffic will inhibit vegetation growth and recovery.

Effects of the Alternatives

As a means of comparing alternatives, **Table 4-51** depicts the miles of wheeled motorized routes that cross or are within 300 feet of streams on BLM lands for the Helena TPA.

Table 4-51 Miles of Roads and Trails by Proposed Management Category Within 300 feet of Streams (including intermittent streams) in the Helena Travel Planning Area				
Miles of Wheeled Motorized Routes	ALT A	ALT B	ALT C	ALT D
Open	10.9	4.2	3.4	4.9
Restricted	0	0	0	0
Closed	0	6.7	7.4	6.0

Under Alternative A, 10.9 miles of roads and trails would remain open that cross or are within 300 feet of streams on BLM lands. The noxious weed spread,

streambank, and sediment delivery effects would continue as described above.

Under Alternative B, 4.2 miles of BLM roads and trails that cross or are within 300 feet of streams would remain open, and 6.7 miles of roads and trails would be closed. The noxious weed spread, streambank, and sediment delivery effects would be slightly reduced in comparison to Alternative A, however the roads along Sevenmile Creek and Skelly Gulch which impact riparian areas the most would remain open because they are non-BLM county roads and provide access to these respective areas.

Under Alternative C, 3.4 miles of BLM roads and trails that cross or are within 300 feet of streams would remain open, and 7.4 miles of roads and trails would be closed. The noxious weed spread, streambank, and sediment delivery effects would be slightly reduced in comparison to Alternatives A and B, however the roads along Sevenmile Creek and Skelly Gulch which impact riparian areas the most would remain open because they are non-BLM county roads and provide access to these respective areas. Alternative C would provide the most benefit of all alternatives to riparian vegetation on BLM lands.

Under Alternative D, 4.9 miles of BLM roads and trails that cross or are within 300 feet of streams would remain open, and 6.0 miles of roads and trails would be closed. The noxious weed spread, streambank, and sediment delivery effects would be slightly reduced in comparison to Alternatives A, but would be greater than under Alternatives B and C. The roads along Sevenmile Creek and Skelly Gulch which impact riparian areas the most would remain open because they are non-BLM county roads and provide access to these respective areas.

Cumulative Effects on Riparian Vegetation

Noxious weed spread, mining, roads and trails, logging operations, and livestock grazing have affected riparian resource conditions in all TPAs, including the Helena TPA. Some of these factors continue to cause riparian area degradation primarily through direct disturbance or loss of riparian vegetation. Ground disturbance and loss of riparian vegetation facilitate erosion and sedimentation of streams. In the case of noxious weeds, they usually dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation.

Anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will increase severity of runoff events which in turn will cause more sediment delivery to creeks and streams. The additional sediment is likely to affect the functioning condition of some riparian areas by causing streambeds to aggrade at unnatural rates.

Streambanks may also be affected if road placements do not allow for natural stream movements or meanders.

Logging and forestry practices on public and private lands are subject to streamside management zone (SMZ) requirements designed to maintain water quality and riparian vegetation. The proposed Riparian Management Zones under Butte RMP Alternatives B and C would be wider than SMZs and activities in these areas would be designed to benefit riparian resources, thus providing more riparian protection and more targeted management of riparian vegetation in both forested and non-forested areas than under RMP Alternatives A and D. The disturbance associated with timber activities does have the potential to increase noxious weed spread which degrades riparian area function and health. On public lands noxious weed control is a standard feature of any ground disturbing activities whereas on private lands noxious weed control is variable.

Livestock grazing will continue in the area and has the potential to impact riparian resource conditions. On BLM lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain riparian vegetation health and vigor. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Riparian conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, riparian conditions would improve because of the streambank protection gained from shrubby root systems and filtering capability of native riparian sedge and rush species.

The BLM fuels reduction project currently being planning for the Scratchgravel Hills would not have any cumulative effects to riparian vegetation because no activities would be planned near riparian areas. There are very few riparian areas in the Scratchgravel Hills portion of the TPA.

Cumulatively the effects of Alternative B would be similar to Alternative A, but would be a slight improvement to riparian vegetation. The closure of a few roads may slightly offset some of the private land road construction and maintenance effects described above.

Cumulatively the effects of Alternative C would be similar to Alternatives A and B, though Alternative C would make the greatest contribution to riparian vegetation by closing the greatest mileage of riparian roads on BLM lands of all alternatives. In comparison to Alternative B, the closure of a few more roads than Alternative B may slightly offset more of the private land road construction and maintenance effects described above.

Cumulatively the effects of alternative D would be similar to alternatives A, B, and C. In comparison to Alternatives B and C, the closure of a few less roads than Alternatives B or C may slightly offset less of the private land road construction and maintenance effects described above.

Overall, because BLM roads make up only 7.5 percent of all roads in the TPA (under Alternative A), and BLM lands make up 11 percent of all lands in the TPA, the contributions to riparian vegetation benefits associated with closing riparian roads on BLM lands would be minor at the scale of the entire Helena TPA.

WILDLIFE

Effects of Alternative A

Under Alternative A, Helena TPA would have substantially more open roads (52 miles) compared to the action alternatives and would have the highest actual road density on BLM lands, 1.9 mi/mi² (Table 4-52) compared to the action alternatives. Open roads typically increase the level of recreation adjacent to roads. This can result in additional disturbance and displacement of wildlife species. Roads can also encourage the public to recreate in areas that had formerly been secluded. Roads can cause direct mortality to wildlife through road kill, prevent wildlife movement, create disturbance to wildlife via vehicular use, cause the spread of noxious weeds, reduce or eliminate habitat and cause habitat fragmentation on the landscape. Permanent and temporary roads could negatively impact wildlife, including special status species, particularly if roads are open during critical periods such as during the winter or breeding seasons.

Under Alternative A, this TPA would have fewer acres of functional winter range (461 acres of low road density area) compared to the action alternatives (Table 4-52).

Table 4-52
Decision Area Road Densities (mi/mi²) within Elk Winter Range in the Helena Travel Planning Area

	Actual Road Density	Acres of Low Road Density	Acres of Moderate Road Density	Acres of High Road Density
Alternative A	1.9	461	1,331	2,611
Alternative B	1.0	1,152	1,165	2,087
Alternative C	0.7	1,270	1,113	2,021
Alternative D	0.9	1,267	1,110	2,027

Low Density = 0-1 mi/mi², Moderate Density = 1-2 mi/mi², High Density = >2 mi/mi²

The action alternatives would all provide a similar amount of functional winter range, approximately 1,200 acres. Due to the isolated nature of BLM parcels and the substantial amount of development in the TPA, winter range value for big game species is extremely low compared to other areas.

Although the Helena TPA is open for cross country snowmobile use under Alternatives A, B and D, BLM lands in this TPA do not often get favorable snow conditions for this use. Due to snow conditions, the use of snowmobiles would be limited and the effects to big game and other wildlife species would be expected to be minimal the majority of the time. However, when snow conditions do become favorable, snowmobile use of the TPA could have negative effects to big game and other wildlife species. The negative affects due to cross-country snowmobile use could include harassment of big game and other species during the high stress winter season. This could cause individuals to leave an area (temporarily or permanently) and/or an increase in stress that could lead to mortality.

In evaluating impacts of travel planning on elk and other big game species, it is important to consider impacts on security habitat. Elk security is the inherent protection allowing elk to remain in an area despite increases in stress or disturbance associated with the hunting season or other human activities. Security habitat includes blocks of nonlinear forested habitats greater than 250 acres in size that are at least 0.5 mile from an open road. Security habitat should also consist of larger trees (greater than 8 inches DBH) with vegetation dense enough to hide an adult elk. Under Alternatives A and D, there would be no functional security habitat for big game species and Alternatives B and C would provide only a negligible amount of security habitat (257-404 acres) (**Table 4-53**). As with winter range, the isolated nature of BLM parcels along with development of private lands and open roads throughout the TPA prevents the area from having a large amount of functional security habitat.

Table 4-53 Decision Area Acres of Big Game Security Habitat in the Helena Travel Planning Area by Alternative				
	A	B	C	D
Helena TPA	0	257	404	0

Core areas are areas large enough for wildlife (especially animals with large home ranges such as carnivores and big game) to forage and reproduce. Subcore areas are areas that could act as stepping stones for wildlife as they move through the region. For all lands in the Helena TPA, all alternatives would have the same amount of acres with low (5,942 acres with road density less than 1 mi/mi²), moderate (2,762 acres with road densities of 1-2 mi/mi²) and high (2,061 acres with road densities

greater than 2 mi/mi²) road densities in core and subcore habitat.

On BLM lands, there are only approximately 501 acres in core/subcore habitat. All alternatives would have the same acres in low (71 acres), moderate (216 acres) and high (114 acres) road densities for core and subcore habitat.

Wildlife corridors are areas of predicted movement within or between core and subcore areas. Within the Helena TPA there are no acres identified as "high quality" wildlife movement corridors under any land ownership. There are approximately 21,804 acres identified as moderate quality corridors for all land ownerships and 19,439 acres within low quality corridors. Under all alternatives, moderate quality movement corridors would have 6,455 acres with low road density, 4,803 acres with moderate road density but the majority of acres, 10,546, would be in high road density. On BLM lands in the TPA there are only 379 acres mapped as moderate quality movement corridors but there is more BLM land (2,660 acres) in areas considered to be low quality corridors.

Riparian areas provide crucial habitat and critical travel corridors for wildlife including special status species. Riparian areas also provide a refuge for native plants and animals in times of stress such as drought or fire. Roads in riparian areas can prevent use of these crucial areas by wildlife, limit use, or cause loss of habitat. Under Alternative A, there would be 10.9 miles of open roads in riparian areas, the most of any alternative.

Effects of Alternative B

Under Alternative B, the Helena TPA would have substantially fewer open roads (13.6 miles) compared to Alternative A (52 miles). Alternative B would have more open road than Alternative C (7 miles) but less than Alternative D (22 miles). Alternative B would decrease harassment to wildlife during all seasons of use compared to Alternatives A and D. This alternative would also improve habitat and reduce fragmentation more than Alternatives A and D but less than Alternative C.

Under Alternative B, the actual road density in elk winter range in the Helena TPA would be at the 1 mi/mi² recommended as a maximum by FWP in big game winter range. This is lower than the road density under Alternative A, 1.9 mi/mi², higher than Alternative C (0.7 mi/mi²) and higher, but similar, to Alternative D (0.9 mi/mi²) (**Table 4-52**).

Under Alternative B, this TPA would have more acres of functional winter range (1,152 acres) compared to Alternative A (461 acres), slightly less than Alternative C (1,270 acres) but also slightly less than Alternative D (1,267 acres) (**Table 4-52**). All action alternatives would improve the quality and quantity of winter range in the Helena TPA to a similar degree and all action

alternatives would have more beneficial effects on winter range compared to Alternative A.

Like Alternatives A and D, the entire Helena TPA would be open for cross country snowmobile use with Alternative B. The effects would be the same as described under Alternative A.

The amount of big game security habitat would be low, but still more under Alternatives B and C (257 and 404 acres, respectively) compared to Alternatives A and D which would have no functional security habitat (**Table 4-53**).

Alternative B would protect and restore more riparian habitat than Alternative A by reducing the miles of open roads in riparian acres to 4.2 miles (from 10.9 miles under Alternative A). Alternative B would have more open roads in riparian areas than Alternative C (3.4 miles) but less than Alternative D (4.9 miles). Alternative B would allow for more breeding, foraging, and hiding habitat as well as improve more movement corridors for a wide variety of species than Alternatives A and D but less than Alternative C.

Effects of Alternative C

Under Alternative C, the Helena TPA would have substantially fewer open roads (7.0 miles) compared to Alternative A (52 miles). Alternative C would also have fewer open roads than Alternative B (13.6 miles) and Alternative D (22 miles). Alternative C would decrease harassment to wildlife during all seasons of use compared to all other alternatives. This alternative would also improve habitat and reduce fragmentation more than all other alternatives.

Under Alternative C, the actual road density in elk winter range in the Helena TPA on BLM lands would be 0.7 mi/mi², below the maximum of 1 mi/mi² recommended by FWP in big game winter range. This is lower than the road density under Alternative A (1.9 mi/mi²), lower than Alternative B (1.0 mi/mi²) and lower than Alternative D (0.9 mi/mi²) (**Table 4-52**).

Under Alternative C, this TPA would have more acres of functional winter range (1,270 acres) compared to Alternative A (461 acres), slightly more than Alternative B (1,152 acres) and nearly the same as Alternative D (1,267 acres) (**Table 4-52**). All action alternatives would improve the quality and quantity of winter range in the Helena TPA to a similar degree and all action alternatives would have more beneficial effects on winter range compared to Alternative A.

Under Alternative C, snowmobile use throughout the entire Helena TPA would be limited to open routes (2.8 miles). This would greatly reduce the negative effects associated with snowmobile use to big game and other wildlife species compared to all other alternatives.

The amount of big game security habitat under Alternative C would be low (404 acres), but would still be greater than under any other alternative (**Table 4-53**).

Alternative C would protect and restore more riparian habitat than Alternative A by reducing the miles of open roads in riparian acres to 3.4 miles (from 10.9 under Alternative A). Alternative C would also have fewer open roads in riparian area than Alternative B (4.2 miles) and Alternative D (4.9). Alternative C would allow for more breeding, foraging, and hiding habitat as well as improve more movement corridors for a wide variety of species more than all other alternatives.

Effects of Alternative D

Under Alternative D, the Helena TPA would have considerably fewer open roads (22 miles) compared to Alternative A (52 miles). Alternative D, however, would have considerably more open roads than Alternative B (13.6 miles) and, especially, Alternative C (7 miles). Alternative D would allow considerably more harassment to wildlife during all seasons of use than Alternatives B and C but less than Alternative A. This alternative would also restore fewer acres of habitat and allow more fragmentation than Alternatives B and C but substantially less than Alternative A.

Under Alternative D, the actual road density in elk winter range in the Helena TPA would be below the maximum of 1 mi/mi² recommended by FWP in big game winter range at 0.9 mi/mi². This is lower than the road density under Alternative A (1.9 mi/mi²), lower than Alternative B (1.0 mi/mi²) and higher than Alternative C (0.7 mi/mi²) (**Table 4-52**).

Under Alternative D, this TPA would have more acres of functional winter range (1,267 acres) compared to Alternative A (461 acres), slightly more than Alternative B (1,152 acres) and nearly the same as Alternative C (1,270 acres) (**Table 4-52**).

Like Alternatives A and B, the entire Helena TPA would be open for cross country snowmobile use with Alternative D. The effects would be the same as described under Alternative A.

There would be no functional big game security habitat under Alternatives D and A. Although low, there would be 257 acres of security habitat under Alternative B and 404 acres under Alternative C (**Table 4-53**).

Alternative D would protect and restore more riparian habitat than Alternative A by reducing the miles of open roads in riparian acres to 4.9 miles (from 10.9 under Alternative A). Alternative D would have more open roads in riparian area than Alternative B (4.2 miles) and Alternative C (3.4 miles). Alternative D would allow for more breeding, foraging and hiding habitat as well as improve more movement corridors for a wide variety of species than Alternative A but less than Alternatives B and C.

Cumulative Effects on Wildlife

Wildlife habitat in the Helena TPA has been affected by roads, historic and current mining, timber harvest, weed infestations, urbanization and development, recreation, powerline corridor development and communication sites.

Like much of the West, the Helena Valley has been experiencing steady population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. The majority of BLM managed routes for the Helena TPA are located in or adjacent to the Scratchgravel Hills and Birdseye area. The Scratchgravel Hills is an island of undeveloped hills surrounded by residential development. Residential development has tripled from 300 residential homes in 1984 to over 1,000 homes today. Additional development is ongoing.

Approximately 8,000 acres within the TPA is also managed by the National Guard for military maneuvers and training. Some helicopter-based training also occurs there.

Recreation use is well established in the TPA. Primary recreation activities include motorized OHV uses (ATV, motorcycle) and non-motorized uses (hiking, jogging, horseback riding, mountain biking, etc.).

The Scratchgravel Hills contains precious and base metals in both hard rock and placer deposits. Over the years there have been a large number of patented and unpatented mining claims distributed throughout the area. Currently, only a few claims are maintained but increases in mineral prices could lead to increased or renewed mining activity.

In the TPA, there are eight powerlines and six pipelines. There are no existing communication sites in the TPA and, in the future, communication sites on BLM lands will be restricted to existing sites. No future communication sites are expected on BLM lands in the TPA but could occur on private or other public lands. There is the potential for future powerlines and pipelines to be built in this TPA.

There are approximately 26 rights-of-way (ROW) in the TPA and applications for ROW permits to access private property or for commercial development are likely to increase in the future. As a result, public access to BLM lands could increase. Fewer ROWs would be expected under Alternative A because all BLM roads would remain open under this alternative. Alternative B would be expected to have fewer ROWs than Alternative C but more than Alternatives A and D. Alternative C would be expected to have the most ROWs and, of the action alternatives, Alternative D would have the fewest.

From 1981-2004 there have been 14 wildland fires that burned 65 acres of BLM lands (it is unknown how many acres burned in the entire TPA). Eleven of the fires were identified as human-caused and these fires burned the

majority of the BLM acres (54). There has been one fuels reduction treatment that consisted of grinding small to medium size understory trees on 150 acres in the Scratchgravel Hills. Timber harvest has occurred on approximately 133 acres of BLM lands in the TPA over the last 17 years. In the foreseeable future, approximately 1,500-2,000 acres of BLM lands will likely be treated in the Scratchgravel Hills to thin dense, overstocked stands of dry Douglas fir and ponderosa pine as well as remove conifer encroachment from meadows. This would improve habitat for dry forest species. Vegetative treatments on BLM lands have had minor effects to wildlife habitat in the TPA. However, timber harvest and development on private lands has substantially altered the landscape and caused a substantial decline in the quality and quantity of wildlife habitat in the TPA.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the TPA. Motorized activities play a large role in the distribution of noxious weeds. The cumulative effects of the spread of noxious weeds from open roads would be greater under Alternative A than all other alternatives. Alternative A would result in more wildlife habitat being lost or degraded due to noxious weed infestations compared to the action alternatives. Alternative B would have fewer open roads than Alternatives A and D resulting in fewer infestations of noxious weeds. Alternative C would close the most roads and would have the fewest cumulative effects from loss of habitat due to noxious weeds of all alternatives. Open roads and development adjacent to BLM lands and the substantial amount of public use this area receives would still allow for the spread of noxious weeds.

Fragmentation of BLM lands in the TPA (only 11 percent of the TPA is in BLM ownership); open roads on BLM (52 miles), private (about 581 miles), and other public lands (about 60 miles); as well as adjacent residential development has reduced the quality of wildlife habitat within the TPA. Roads and development within the TPA can cause disturbance to wildlife along with fragmentation and loss of habitat. Roads are associated with nearly every type of activity that has the potential to occur in the TPA including; vegetation treatments, timber salvage, mining, access to private lands (ROWs), fire suppression, powerline corridors and recreation. Open roads in the Planning Area would likely increase due to development and management of private lands. Alternative A would have the greatest negative cumulative effects to wildlife and wildlife habitat from open roads with 52 miles of open roads. Alternative B would have fewer negative cumulative effects with 13.6 miles of open road than Alternatives A and D (22 miles) but more than Alternative C (7 miles).

Of the action alternatives, Alternative C would have the most beneficial cumulative effects by reducing habitat fragmentation, restoring habitat, and reducing

disturbance. Alternative B would be more beneficial than Alternatives A and D but less than Alternative C.

Historic and recent timber cutting (mostly on private lands), past mining activity and firewood gathering in the TPA has reduced the amount of suitable snag habitat for cavity nesting species and the area is snag deficient. Alternative A would allow a substantial amount of access to the area for firewood cutting that would continue to prevent snag recruitment for snag dependant species and minimize the amount of down woody material. Alternative B would protect more snag and down wood habitat from loss due to firewood cutting than Alternatives A and D but would protect less of this habitat type than Alternative C.

In the Helena TPA, open habitat of grasslands and shrublands along with high road densities in both the Decision and Planning Areas have prevented BLM lands from providing suitable security habitat for big game during the hunting seasons. Under Alternatives A and D, there would be no security habitat in the TPA in the Decision Area and there would be no security habitat in the future. Alternatives B and C would provide some security habitat for big game (257 and 404 acres, respectively). Security habitat would still be limited on private (unless closed to hunting) and other public lands.

There would be no differences in cumulative effects from travel planning with any alternative for core/subcore habitat or wildlife movement corridors in the Helena TPA. Fragmentation of habitat due to development, roads, and disturbance has caused the greatest impact on the amount and quality of core/subcore habitat and wildlife movement corridors. Only 11 percent of the TPA is considered core/subcore habitat and the majority of this is on Forest Service lands.

The cumulative effects of high road densities would continue to negatively affect wildlife species during the breeding season more under Alternative A than under the action alternatives. Alternatives B and C would have the most beneficial cumulative effects to wildlife during the breeding season compared to Alternative D and, especially, Alternative A.

FISH

For the sake of this discussion, “open” roads include roads that are open with seasonal restrictions as well as roads that are open yearlong. Roads identified as “closed” within 300 feet of streams also include roads that would be “decommissioned” in these areas by alternative. Effects to water quality described in the Water Resources section would affect fish populations and fish habitat quality. Analyses described and tabulated in the Water Resources section are referred to in the context of effects to fish in the discussion below.

Effects of Alternative A

Under Alternative A, Helena TPA would have substantially more open roads (52 miles) compared to the action alternatives. Roads can have a wide range of effects on fish and fish habitat. These effects would include, but are not limited to, increased sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, conduits for noxious weeds, loss of riparian vegetation, potential decreases in stream shading that could lead to water temperature increases, and changes in local fish populations when culverts are impassable and limit fish migration.

Watershed (or hydrologic) function can be used as an indicator of relative risk or impacts to fish habitat. Generally, watersheds with high road densities often have the largest negative effect on fish and aquatic resources. To determine the effects on watershed function, a moving windows analysis was conducted on BLM lands to look at the miles of roads that would be decommissioned and removed from the landscape for each alternative. During this analysis, it was assumed that even though closing roads would improve watershed function, closed roads would remain on the landscape and could still have negative impacts to water quality and prevent or impede the restoration of riparian vegetation. Under all alternatives, there would be 461 acres with low road density on BLM lands in the TPA (**Table 4-49**). Alternatives A and D would have nearly similar acres with moderate road density (1,446 and 1,484 acres, respectively), which would be less than Alternatives B (1,623 acres) and C (1,539 acres). All alternatives would have similar acres with high road density, ranging from 8,117 to 8,294 acres. This comparison shows relatively little difference between Alternative A and the action alternatives. Because the action alternatives close more roads, they would be expected to have fewer negative effects to fish habitat than Alternative A.

For this discussion, road miles within 300 feet of fish bearing streams on BLM lands would be considered an indicator of direct effects to fish habitat and fish populations. Under all alternatives, there would be 0 miles of closed road and 1.7 miles of open road within 300 feet of fish bearing streams on BLM lands. All miles of open roads would be adjacent to streams (Greenhorn Creek and Skelly Gulch) with BLM special status species (westslope cutthroat trout). There is no difference between alternatives in terms of direct effects to fish habitat in the Helena TPA.

Perennial non-fish bearing streams contribute to fish habitat indirectly by serving as conduits of watershed products (water, sediment, nutrients, contaminants, and in some cases woody material) to fish bearing streams. Under Alternative A, there would be 0 miles of closed road and 5.3 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the

TPA. Alternative A would have more miles of open road adjacent to perennial streams than Alternatives B (1.2 miles) and C (1.1 miles) and D (2.8 miles). Alternative A would have the greatest negative impacts to fish and aquatic resources from open roads.

Effects of Alternative B

Under Alternative B, the Helena TPA would have substantially fewer open roads (13.6 miles) compared to Alternative A (52 miles). Alternative B would have more open roads than Alternative C (7 miles) but less than Alternative D (22 miles).

All alternatives would have the same acreage of BLM lands in the low road density category, and relatively similar acreages of land in moderate and high road density categories (**Table 4-49**). However, Alternative B would provide the greatest acreage in the moderate road density category, and the lowest acreage in the high road density category of all alternatives. Alternative B would also improve watershed function and slightly lessen impacts to fish compared to Alternative A because the closed roads under Alternative B would make a slight contribution to improved watershed function.

Effects associated with roads within 300 feet of fish bearing streams (Greenhorn Creek and Skelly Gulch) on BLM lands under Alternative B would be the same as under Alternative A.

Alternative B would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than Alternative A. Under Alternative B there would be 4.1 miles of closed road and 1.2 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. Under Alternative A there would be no closed roads and 5.3 miles of open road in these riparian areas.

Overall, Alternative B would have fewer negative effects to fish and aquatic habitats from increased fine sediment inputs, loss of large woody material and loss of riparian vegetation than Alternative A.

Effects of Alternative C

Under Alternative C, the Helena TPA would have substantially fewer open roads (7.0 miles) compared to Alternative A (52 miles). Alternative C would also have fewer open roads than Alternative B (13.6 miles) and Alternative D (22 miles).

All alternatives would have the same acreage of BLM lands in the low road density category, and relatively similar acreages of land in moderate and high road density categories (**Table 4-49**). However, Alternative C would improve watershed function and slightly lessen impacts to fish compared to Alternatives A and D because the greatest mileage of closed roads under Alternative C (compared to any other alternative) would contribute to improved watershed function.

Effects associated with roads within 300 feet of fish bearing streams (Greenhorn Creek and Skelly Gulch) on BLM lands under Alternative C would be the same as under Alternatives A and B.

Indirect effects associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands under Alternative C would be the same as described under Alternative B.

Alternatives C and B would have similar benefits to fish habitat and would have fewer negative effects to fish and aquatic habitats from increased fine sediment, loss of large woody material and loss of riparian vegetation compared to Alternative A.

Effects of Alternative D

Under Alternative D, the Helena TPA would have fewer open roads (22 miles) compared to Alternative A (52 miles). Alternative D, however, would have more open roads than Alternative B (13.6 miles) and Alternative C (7 miles).

All alternatives would have the same acreage of BLM lands in the low road density category, and relatively similar acreages of land in moderate and high road density categories (**Table 4-49**). However, Alternative D would have the greatest acreage of BLM lands in the high road density category and the lowest acreage in the moderate road density category of the action alternatives. Still, Alternative D would also contribute to improved watershed function and slightly lessen impacts to fish compared to Alternative A because approximately 30 miles of road would be closed or decommissioned in this alternative compared to all roads being open under Alternative A.

Effects associated with roads within 300 feet of fish bearing streams (Greenhorn Creek and Skelly Gulch) on BLM lands under Alternative D would be the same as under all other alternatives.

Alternative D would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than Alternative A. Under Alternative D there would be 2.5 miles of closed road and 2.8 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. While it would be an improvement over the current condition, Alternative D would contribute more indirect effects to fish habitat from these streams than either Alternative B or Alternative C.

Alternative D would have more adverse effects to fish and aquatic habitats from increased fine sediment, loss of large woody material and loss of riparian vegetation than Alternatives B and C but less than Alternative A.

Cumulative Effects on Fish

The Helena TPA supports a variety of native and introduced fish species. One of the major human

influences to fish in the TPA has been the introduction of non-native trout species including rainbow trout, brook trout, and brown trout throughout the TPA. Rainbow trout have hybridized with the native westslope cutthroat trout in many streams. Brook trout and brown trout have displaced the native cutthroats in other streams; especially those altered by sedimentation and increased water temperatures brought on by human activities.

Like much of the West, the Helena Valley has been experiencing steady human population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. The majority of BLM managed routes for the Helena TPA are located in or adjacent to the Scratchgravel Hills and Birdseye area. Scratchgravel Hills is an island of undeveloped hills surrounded by residential development. Residential development has tripled from 300 residential homes in 1984 to over 1,000 homes today. Additional development is ongoing. There are no perennial streams in the Scratchgravel Hills portion of the TPA that could be affected by this development. However, development and urbanization have had substantial impacts to watershed function in this TPA.

Agricultural activities from farming and ranching also contribute increases in nutrients, sedimentation, and loss of aquatic habitats. Many streams in the TPA have been impacted by historic and on-going livestock grazing that breaks down streambanks, widens channels, removes vegetative cover, and causes an increase in fine sediment and nutrients.

The Scratchgravel Hills contains precious and base metals in both hard rock and placer deposits. Over the years there have been a large number of patented and unpatented mining claims distributed throughout the area. Although some streams in the TPA may have been impacted by historic mining activities, it is expected that the amount of aquatic habitat impacted has been minimal due to the lack of streams in this portion of the TPA.

Fires, floods, and drought have historically affected fish habitat in the TPA. These disturbances can cause a pulse of sediment or may temporarily reduce the quality of fish habitat in some watersheds while leaving other streams largely unaffected. Natural disturbances are typically followed by periods of stability, during which fish habitats and populations recover. Population recovery in disturbed streams may be facilitated by fish immigration from nearby drainages less affected by the catastrophic event. From 1981-2004 there have been 14 wildland fires that burned 65 acres. Eleven of the fires were identified as human-caused and these fires burned the majority of the acres (54). There has been one fuels reduction treatment that consisted of grinding small to medium size understory trees on 150 acres in the Scratchgravel Hills. This project had no effects to aquatic habitats.

Timber harvest can alter the recruitment of large woody debris, reduce canopy closures, and result in an increase in fine sediment to streams. Timber harvest along with associated roads can contribute substantially to the overall cumulative effects in forested watersheds. Timber harvest has occurred on approximately 133 acres of BLM lands in the TPA over the last 17 years. In the foreseeable future, approximately 1,500-2,000 acres will be treated in the Scratchgravel Hills to thin dense, overstocked stands of dry Douglas fir and ponderosa pine as well as remove conifer encroachment from meadows. This would have no impacts to aquatic habitats or species. Vegetative treatments on BLM lands have had minor effects to aquatic habitat in the TPA. However, timber harvest and development on private lands have substantially altered the landscape and may have caused a decline in the quality and quantity of aquatic habitat in the TPA.

Roads are another major contributor of sediment to streams and a major problem with regards to cumulative watershed effects. Roads and trails can have localized effects on nearby stream segments or at stream crossing sites, especially fords. In some cases, effects are more extensive and may impair fish habitat for longer reaches of streams. Cumulatively, roads degrade aquatic habitat due to sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, loss of riparian vegetation, loss of large woody material, and alteration of stream channels and floodplains. Roads can cause changes in local fish populations when culverts are impassable and limit fish migration. Alternative A would have more negative cumulative effects to watersheds and individual streams due to roads than the action alternatives. Alternative B would have fewer negative cumulative effects than Alternatives A and D but more than Alternative C. Alternative B would improve overall watershed functions as well as improve habitat in individual streams more than Alternatives A and D but less than C. Alternative C would have the greatest beneficial effects to fish habitat of all alternatives.

SPECIAL STATUS PLANTS

Effects Common to All Alternatives

Ground-disturbing activities from road construction and maintenance, as well as road use by vehicles can affect special status plant populations and habitat. These activities can reduce sensitive plant species through disturbance to individual populations, increasing competition from invasive species, and reducing habitat connectivity. Closure of roads and trails can improve or maintain sensitive plant populations or habitat by reducing avenues of noxious weed spread, maintaining habitat connectivity, and improving pollinator habitat. Road and trail restrictions have the same effects but to a lesser degree.

Effects of the Alternatives

Under Alternative A, 52.2 miles of roads and trails would remain open. The effects would continue as described in the Effects Common to All Alternatives section.

Under Alternative B, 13.6 miles of roads and trails would remain open, 32.1 miles of roads and trails would be closed, and 6.5 miles would be decommissioned. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The seasonally restricted roads would reduce weed spread a limited amount. Alternative B would reduce risk to and benefit special status plants compared to Alternative A.

Under Alternative C, 7 miles of roads and trails would remain open, 40.7 miles of roads and trails would be closed, and 4.6 miles would be decommissioned. As with Alternative B, on the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative C would benefit and reduce the most risk to special status plants the most of all alternatives because it would eliminate disturbance, vehicular use, and spread of noxious weeds on the most road miles.

Under Alternative D, 21.9 miles of roads and trails would remain open, 27.7 miles of roads and trails would be closed, and 3.1 miles would be decommissioned. On the open roads, effects would continue as described in the Effects Common to All Alternatives section. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for special status plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative D would benefit and reduce risk to special status plants compared to Alternative A, but would pose more risk compared to Alternatives B and C.

Cumulative Effects on Special Status Plants

Under all alternatives there are a number of past, present, and reasonably foreseeable future actions that affect special status plant populations.

Livestock grazing will continue in the area and has the potential to impact sensitive plant populations and habitat. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain sensitive species populations and habitat. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the

extent that these efforts are successful, sensitive plants would benefit from the reduced competition. Use of herbicides for noxious weed control could cause mortality to special status plants if individual plants are inadvertently sprayed.

Recent and anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will reduce sensitive plant species habitat and in some cases individual populations. Additionally, subdivisions have the potential to disrupt the connectivity of plant habitat and populations as well as disturbing or eliminating pollinators needed by sensitive species. Some sensitive species that require soil disturbance may benefit.

Timber sale activity disturbance can destroy or degrade sensitive plant habitat. On public lands, projects would be designed to avoid, mitigate, or enhance sensitive plant habitats. The disturbance associated with timber harvest activities does have the potential to increase noxious weed spread which degrades sensitive species habitat and individual plant populations.

The fuels reduction project scheduled for the Scratchgravel Hills is not anticipated to have any adverse effects on special status plants. Treatments would be designed to minimize surface disturbance in sensitive plant habitat. Additionally, treatment would improve habitat in some areas by opening up parks and edges where trees have expanded into grassland soils and trees have thickened to the point of closing canopies.

At the scale of the entire Helena TPA (all land ownerships), the BLM travel plan alternatives would have slightly variable contributions to cumulative effects on special status plants. Under Alternative B adverse effects on special status plants would be slightly reduced compared to Alternative A because 5.6 percent of all roads in the TPA would be closed or decommissioned. Alternative C would provide the most benefits of all alternatives as 6.5 percent of all roads in the TPA would be closed or decommissioned. Alternative D would provide slightly more benefits than Alternative A but slightly fewer benefits than either Alternatives B or C as 4.4 percent of all roads in the TPA would be closed or decommissioned. Because BLM lands make up only 11 percent of all lands in the TPA, activities on non-BLM lands would play a greater role in determining the status of special status plants.

WILDLAND FIRE MANAGEMENT

Travel planning alternatives were analyzed to determine whether they could result in impacts on wildland fire management, causing change to any of the following indicators:

- Fire regime condition class (FRCC)
- Firefighter and public safety

- Reducing threat to Wildland Urban Interface (WUI)

Effects Common to All Alternatives

Public road access during the fire season provides opportunities for human-caused fires either due to catalytic converters on vehicles igniting dry vegetation, or due to some types of human activities. Roads that are closed to public access reduce the risk of human-caused fire starts in those areas.

Decommissioned roads and roads that are closed and not regularly maintained for navigability reduce access for fire suppression. Closed roads may become impassible due to vegetation regrowth, downfall of trees, or severe erosion. Some roads may be closed with earthen berms or fallen trees and would need to be physically manipulated to make them useable for vehicles again. These roads would extend firefighting response time and have negative impacts on efforts to reduce wildland fire threat to WUI areas and firefighter and public safety. In an emergency fire suppression situation, any navigable closed roads needed for fire suppression would be used immediately. Non-navigable closed roads could also be used if deemed to be needed for fire suppression, after needed improvements are made to make those roads useable. Planning and implementation of fuels reduction treatments could occur in association with closed roads if variances for temporary road use were to be allowed. Variances would be subject to internal BLM review.

In the context of fuels reduction projects, availability of open roads is important to facilitating fuels project location as well as increasing project feasibility and decreasing costs. Open roads also facilitate spread of noxious weeds by transporting weed seed on vehicles and their tires. Presence of large noxious weed populations could delay or cause fuels projects to be cost-prohibitive due to the fact that the weeds may have to be treated before and/or after the fuels treatment. Also, some applications of fuel treatments (e.g., prescribed fire) may promote the spread of some weeds. The presence of weeds and non-native species are indicators that FRCC has departed from historical conditions.

Noxious weeds and non-native invasive species are well established and spreading in the Helena TPA.

Effects of Alternative A

Under Alternative A all existing routes in the Helena TPA would continue to be open yearlong (52.2 miles) to wheeled motorized users. Alternative A would allow for the greatest flexibility between alternatives for access for suppression purposes. Fuels project feasibility would be highest under this alternative. However, public access during the fire season would be the greatest under this alternative and would provide the most opportunities for human-caused fire starts.

The distribution of noxious weeds could be the greatest under Alternative A with the most open roads and noxious weeds already well established. This would contribute to reduced feasibility of fuels projects more than under any other alternative.

Effects of Alternative B

Under Alternative B, wheeled motorized travel (13.6 miles) would be restricted to the following four areas in the Scratchgravel Hills: routes leading to five non-motorized trailheads; a short out-and-back route off of Norris Road; a loop route between Head Lane and Echo Lane; and all existing public access rights-of-way. Roads in these four areas would be open yearlong.

Alternative B would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A due to the fact that access would be limited to 13.6 miles of road. Of the 38.6 of closed roads, 6.5 miles would be decommissioned. The risk of human-caused fires associated with motorized use would be limited compared to Alternative A, due to a 74 percent decrease in miles of road open to motorized public travel.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would be closed under this alternative, Alternative B should help reduce the spread of noxious weeds and may make fuels treatments more feasible than under Alternative A, reducing FRCC departure.

Effects of Alternative C

Alternative C would restrict wheeled motorized travel to five non-motorized trailheads in the Scratchgravel Hills. This alternative provides the least number of wheeled motorized routes in the Helena TPA (7.0 miles) but provides an extensive network of routes for non-motorized enthusiasts.

Alternative C would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down due to the fact that access would be limited to 7 miles of road. Of the 45.2 miles of closed roads, 4.6 miles would be decommissioned. The risk of human-caused fires associated with motorized use would be reduced more than under either Alternatives A or B, due to an 87 percent decrease in miles of open road compared to Alternative A. However, this may promote more non-motorized users to a concentrated area, increasing the odds for a human-caused fire to occur by another ignition source.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would be closed than under any other alternative, Alternative C should help reduce the spread of noxious weeds and may make fuels treatment more feasible than any other alternative, reducing FRCC departure.

Effects of Alternative D

Under Alternative D, 21.9 miles of open routes would be available yearlong for wheeled motorized use and 3.1 miles of the 30.8 of closed roads would be decommissioned. Alternative D would be more flexible than alternatives B and C, but again it would limit flexibility for access for suppression purposes and fuels project feasibility would go down compared to Alternative A. The risk of human-caused fires associated with motorized use would be reduced compared to Alternative A but would be greater than under Alternatives B and C, due to a 58 percent decrease in miles of open road compared to Alternative A.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because an intermediate number of road miles would be closed under this alternative, Alternative D should help reduce the spread of noxious weeds and may make fuels treatments more feasible than under Alternative A, but would increase weed spread and potentially make projects less feasible than Alternatives B or C.

Cumulative Effects on Wildland Fire Management

Effects on wildland fire management associated with any of the BLM travel plan alternatives would be overshadowed by reasonably foreseeable uncharacteristic fire, continued fire suppression made necessary by WUI and intermingled landownership, and large-scale insect infestations and disease outbreaks that would continue to increase fuel loading for the planning period.

Revision of the Helena National Forest Plan could result in more or less treatment of adjacent areas. Because no decision has been made, the effects are not known. Wildland fire management on USFS lands will be determined in the plan decision, particularly areas where wildland fire use (management of naturally ignited wildland fires to achieve resource objectives) may occur. BLM would need to coordinate with USFS on all wildland fire use actions and events. Wildland fire use on USFS lands could affect FRCC on BLM lands. USFS lands make up 25 percent of all lands in the TPA so activities there would likely have more influence on future fire characteristics than activities on BLM lands (10.6 percent of all lands in TPA).

Additionally, decisions to increase the level of wildland fire use, prescribed fire, or open burning by public could impact the BLM's ability to use wildland fire and prescribed fire due to air quality concerns and requirements. This could postpone or eliminate BLM fuel reductions or treatments to improve FRCC.

Access is a critical component of wildland fire suppression. In some cases, access to public lands is being reduced by adjacent landowners gating or closing

roads, which could hamper wildland fire suppression efforts and pose a risk to public and firefighter safety. Reducing access would also increase the potential for larger fires to occur due to an increase in time needed to access a fire and control it. Time needed to move in crews would be extended, and the ability to effectively apply and place resources (e.g., engines, water tenders, etc.) would be limited.

Effects on wildland fire management, including FRCC and firefighter and public safety due to management accomplished by other landowners may affect wildland fire management on public lands. When activity fuels (i.e. slash from logging) are not treated adequately, fuel hazard could increase on adjacent lands which could affect fire intensity and severity on public lands. When adjacent landowners treat fuels or implement fire mitigation plans in the WUI, fires are easier to suppress and firefighter safety is increased. In this TPA, activities on private lands (59 percent of all lands in TPA) would have more influence on future fire characteristics in the area overall than activities on BLM lands (10.6 percent of all lands in TPA). Human population increases and subsequent development are likely to expand the WUI and could alter forest management, taking the emphasis off restoring historic composition and structure and focusing more on fuels reduction.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Effects Common to All Alternatives

Alternative-specific risks or impacts to cultural and paleontological resources are difficult to discern due to a lack of extensive site-specific knowledge about the presence of these resources in a given TPA. By designating open routes, limiting open-country travel, and closing some routes, inadvertent discovery of cultural and paleontological resources and vandalism to them is reduced. Higher road densities in a given area would allow greater access to more land on the average, but that does not imply greater amounts of vandalism, since the vehicles would remain on designated routes.

VISUAL RESOURCES

Effects Common to All Alternatives

Roads (temporary or permanent) may affect visual quality. Roads that remain open for public use may impact visual qualities where noticeable. The quantity of open roads would also influence sensitivity levels since with more open roads, more areas would generally be viewed by more members of the public. Closing or decommissioning roads would generally reduce effects to visual resources and reduce sensitivity levels because fewer members of the public would generally be accessing and viewing areas with closed roads.

Effects of the Alternatives

Under Alternative A, all 52.2 miles of BLM road would remain open, thereby providing for the greatest level of impact to visual resources of all alternatives.

Under Alternative B there would be 13.6 miles of open road, 32.1 miles of closed road, and 6.5 miles of decommissioned road. Road closures and decommissioning under this alternative would reduce effects on visual resources compared to Alternative A. Under Alternative C there would be 7 miles of open road, 40.7 miles of closed road, and 4.6 miles of decommissioned road. Alternative C would have fewer adverse effects and would improve visual resources the most of all alternatives.

Under Alternative D, there would be 21.9 miles of open road, 27.7 miles of closed road, and 3.1 miles of decommissioned road. Alternative D would improve visual resources compared to Alternative A, but would have more adverse effects than Alternatives B and C.

Cumulative Effects on Visual Resources

Under all alternatives, most activities on BLM lands would generally not adversely affect visual resources to unacceptable degrees because discretionary activities on BLM lands would be required to meet Visual Resource Management objectives within individual project areas. The Scratchgravel Hills fuels reduction project currently being planned would be designed to meet VRM objectives.

Activities on non-BLM lands, particularly activities near BLM lands associated with residential development, urbanization, or vegetation management, could have adverse cumulative effects on visual resources on BLM lands because BLM VRM objectives would obviously not apply to non-BLM activities.

LIVESTOCK GRAZING

Effects Common to All Alternatives

Roads and trails can potentially affect livestock grazing management. Roads and trails often act as avenues of noxious weed spread. Noxious and invasive weeds can reduce the quantity and quality of forage available for livestock. Users of roads and trails can cause management problems for livestock permittees when they leave gates open at fences, vandalize range improvements, or harass livestock either purposely or unintentionally.

Closure of roads and trails can improve or maintain the forage base by reducing vectors of noxious weed spread. Additionally, road and trail closures can reduce management conflicts. On the other hand, closures may increase permittees' time requirements if and when work has to be conducted with horses or afoot. Permittees could minimize effects of closed roads on grazing

management by seeking variances from the BLM for temporary use of specific closed roads.

Effects of the Alternatives

Under Alternative A, 52.2 miles of roads and trails would remain open. Effects associated with these roads would be as described above. All action alternatives would close or decommission more roads and trails than Alternative A. As more roads and trails are closed, noxious and invasive weed spread along with multiple user conflicts would be reduced. On the other hand, permittee management time may increase. Consequently, more effects as described under the Effects Common to All Alternatives section would occur under Alternative C (7 miles open, 45.3 miles closed or decommissioned) than under any other alternative. Alternative B (13.6 miles open, 38.6 miles closed or decommissioned) would produce fewer effects than Alternative than C, but more than Alternative A or Alternative D (21.9 miles open, 30.8 miles closed or decommissioned). Alternative D would have fewer effects than Alternatives B or C, but more than Alternative A.

Cumulative Effects on Livestock Grazing

A number of past, present, and reasonably foreseeable future actions affect livestock grazing at the scale of the entire Helena TPA. Livestock grazing will continue in the area and has the potential to impact forage quality and quantity. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain forage quality and quantity. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, forage conditions would benefit.

The fuels reduction project scheduled for the Scratchgravel Hills is not anticipated to have any adverse effects on livestock grazing.

Because BLM lands make up only 11 percent of all lands in the Helena TPA, all of the BLM travel plan alternatives would have a minimal contribution to cumulative effects on livestock grazing at the scale of all lands in the Helena TPA.

MINERALS

Effects Common to All Alternatives

Road closures and decommissioning could affect access to locatable minerals in areas of moderate or high mineral potential. Operators would be required to seek travel variances from the BLM to use motor vehicles to

conduct mineral exploration on closed roads, or to conduct exploration on seasonally restricted routes during the season of closure. Decommissioned roads could not be used for motorized exploration. Travel management provisions that require a permit or variance could result in reducing access to mining claims or interfere with the ability to conduct exploration work for some operators. Historic knowledge of mineralized areas associated with "closed" roads may be lost after long periods of time if no exploration occurs there. Additional costs and time could be required for exploration and development of mining projects associated with closed or decommissioned roads. Impacts of road closures or decommissioning in areas with low mineral potential would not be substantial to mineral development.

Effects of the Alternatives

Effects of the alternatives for the Helena TPA on access to mineralized areas are summarized in **Table 4-54**. Alternative A for the Helena TPA would not impact any mineralized areas as all roads would be left open.

Alternative B for the Helena TPA would close 56 percent and would decommission 12 percent of roads in high mineral potential areas. An additional 2 percent of the roads in moderate mineral potential areas would be closed under this alternative (**Table 4-54**). Alternative B would have more impacts than Alternative A.

Alternative C of the Helena TPA would close 72 percent and decommission 9 percent of the roads in areas with high mineral potential. Two percent of the roads in areas with moderate mineral potential would be closed under this alternative for this area (**Table 4-54**). Alternative C would have the most potential to affect access to mineralized areas of all the alternatives.

Alternative D of the Helena TPA would close 49 percent and decommission 6 percent of the roads in areas with high mineral potential. Two percent of the roads in areas with moderate mineral potential would be closed in this alternative in this TPA (**Table 4-54**). Alternative D would have more impacts than Alternative A, but less than Alternatives B and C.

Cumulative Effects on Access to Mineralized Areas

No other past, present, or reasonably foreseeable future actions in the Helena TPA would adversely affect mineral availability or access.

RECREATION

Effects of travel plan alternatives on Recreation in the Helena TPA are described qualitatively below.

Effects of Alternative A

Under Alternative A, all existing routes in the Helena TPA would continue to be open yearlong (52.2 miles) to wheeled motorized users. Cross-country snowmobile

Table 4-54 Analysis of Access to Mineral Potential Areas Helena TPA				
Mineral Potential	Open Miles (%)	Seasonally Restricted Miles (%)	Closed Miles (%)	Decom Miles (%)
Alternative A				
High	48.4 (93%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Moderate	1.0 (2%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Low	2.8 (5%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Total Miles = 52.2				
Alternative B				
High	12.9 (25%)	0.0 (0%)	29.1 (56%)	6.5 (12%)
Moderate	0.0 (0%)	0.0 (0%)	1.0 (2%)	0.0 (0%)
Low to none	0.7 (1%)	0.0 (0%)	2.0 (4%)	0.0 (0%)
Total Miles = 52.2				
Alternative C				
High	6.2 (12%)	0.0 (0%)	37.6 (72%)	4.6 (9%)
Moderate	0.0 (0%)	0.0 (0%)	1.0 (2%)	0.0 (0%)
Low to none	0.7 (1%)	0.0 (0%)	2.0 (4%)	0.0 (0%)
Total Miles = 52.2				
Alternative D				
High	20.0 (38%)	0.0 (0%)	25.9 (49%)	3.1 (6%)
Moderate	0.0 (0%)	0.0 (0%)	1.0 (2%)	0.0 (0%)
Low to none	1.9 (4%)	0.0 (0%)	0.8 (1%)	0.0 (0%)
Total Miles = 52.7 (Includes Proposed New Construction)				

Mineral Potential areas have been delineated by the Montana Bureau of Mines and Geology (MBMG)

travel would continue to be allowed as well as travel on all routes. Alternative A provides the greatest opportunities for motorized users, and the least for non-motorized users (mountain bikers, hikers, cross-country skiers, snowshoers, etc.) of all alternatives. Conflicts between motorized and non-motorized users would be expected to increase under this alternative.

Effects of Alternative B

Under Alternative B, wheeled motorized travel (13.6 miles) would be restricted to four areas in the Scratchgravel Hills: routes leading to five non-motorized trailheads; a short out-and-back route off of Norris Road; a loop route between Head Lane and Echo Lane; and all existing public access rights-of-way. Roads in

these four areas would be open yearlong. Cross-country snowmobile use would be allowed, as well as snowmobile travel on all existing routes during the season of use (12/2-5/15), conditions permitting. Conflicts between non-motorized users (cross-country skiers, snowshoers) and snowmobilers would be expected to continue or increase as a result.

The effects of closing the Scratchgravel Hills area to motorized vehicle uses from dusk to dawn would reduce use violations, risks of human caused fires, conflicts with proximity residents and law enforcement incidents.

Effects of Alternative C

Alternative C would restrict wheeled motorized travel to five non-motorized trailheads in the Scratchgravel Hills. This alternative would provide the least number of wheeled motorized routes in the Helena TPA (7.0 miles), but would provide an extensive network of routes for non-motorized enthusiasts. Under Alternative C, no snowmobile use would be allowed, including the trailhead access routes.

Although closing the entire Scratchgravel Hills area to both motorized and non-motorized recreational uses after dark (dusk to dawn) yearlong would best protect the area from violations. Management and law enforcement demands would increase compared to Alternatives A, B, and D. Impacts on legitimate public users would be negligible as their use of the area after dark is minimal.

Effects of Alternative D

Under alternative D, 21.9 miles of open routes would be available yearlong for wheeled motorized use. Alternative D would provide the greatest opportunities for motorized users, and the least for non-motorized users. Cross-country snowmobile use would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), snow conditions permitting. Under Alternative D, conflicts between non-motorized users (cross-country skiers, snowshoers) and snowmobilers would be expected to continue or increase as a result.

Cumulative Effects on Recreation

Cumulative effects of travel plan alternatives are discussed below in the context of effects of past, present, and reasonably foreseeable future activities in the Helena TPA.

Under Alternative A, current travel management of the Scratchgravel Hills coupled with increased projections in area use and residential developments nearby would increase the potential for greater conflicts between motorized and non-motorized users. Projected fuel treatments, mining activity and inholding developments could adversely impact the natural setting and user experiences. Special Recreation Use Permits (SRP) events (folging, foot racing, horseback riding and

mountain biking) would continue although social conflicts could increase. The three trailhead sites would continue to be maintained and user demands would continue to increase. Motorized users would be least impacted under this alternative.

Under Alternative B, closing all major motorized travel routes with the exception of the Head Lane/Echo Lane loop coupled with the dusk to dawn closure within the Scratchgravel Hills would greatly enhance non-motorized opportunities during the spring/summer and fall seasons and reduce user violations. Motorized opportunities would be greatly reduced and riders would be displaced to other areas. Increased demands on the area due to additional residential developments, rights-of-way permits, fuel treatments, and possible mining activities would present fewer social conflicts and management concerns given these additional restrictions. Unregulated snowmobile uses in the area could perpetuate future conflicts with non-motorized users and nearby residents during limited periods of favorable snow conditions. SRP events (folging, foot racing, horseback riding and mountain biking) would be enhanced and visitor uses at the established trailheads would be expected to increase moderately.

Under Alternative C, motorized travel management restrictions coupled with all other past, present and reasonably foreseeable actions described under Alternatives A and B would best enhance opportunities for non-motorized uses. Conflicts between motorized and non-motorized users would be minimized to the greatest extent while cumulative impacts on motorized users would be the highest. Other impacts would be similar to Alternative B.

Under Alternative D, travel management of the Scratchgravel Hills coupled with increased projections in area use and nearby residential developments would increase the potential for continued conflicts between motorized and non-motorized users. Projected fuel treatments, mining activity and inholding developments could adversely impact the natural setting and user experiences. SRP events (folging, foot racing, horseback riding and mountain biking) would continue although social conflicts could increase. The trailhead sites would continue to be maintained and user demands would continue to increase. Motorized users would be impacted less than under Alternatives B and C, but more than under Alternative A.

TRAVEL MANAGEMENT AND ACCESS

Effects of Alternative A

All existing routes in the Helena TPA would continue to be open yearlong (52.2 miles), providing a greater number of miles to wheeled motorized users than the action alternatives (Table-4-55). Cross-country snowmobile travel would continue to be allowed as well as travel on all routes, resulting in conflicts between

non-motorized users (cross-country skiers, snowshoers) and snowmobilers. Non-motorized users would have a lower quality recreation experience due to the lack of separate use areas.

Table-4-55 Helena TPA Route Management Summary				
Proposed Management	Total Miles			
	Alt A	Alt B	Alt C	Alt D
Wheeled Motorized Routes				
Open Yearlong	52.2	13.6	7.0	21.9
Seasonally Restricted	-	-	-	-
Closed	-	32.1	40.7	27.7
Decommissioned	-	6.5	4.6	3.1
Non-motorized trails ¹	-	38.6	45.3	30.8
¹ Non-motorized trails include all existing trails, closed roads, and decommissioned roads.				

Under Alternative A, BLM would continue to allow recreational activities, including motorized vehicle use, would continue 24 hours a day within the Scratchgravel Hills. This would allow more illegal activities to occur than under the action alternatives.

The extent of management activities and costs under Alternative A would be mixed. Less personnel time would be required to monitor travel compliance; however, more effort would be required for initial implementation (signing designated routes, installing bulletin boards).

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be minimal under this alternative, given the availability of motorized access. Estimated costs for road/trail maintenance would be highest of all alternatives.

Effects Common to Action Alternatives (B, C, and D)

All action alternatives call for a reduction of open routes in the Birdseye area.

User conflicts would be minimized in the Scratchgravel Hills by providing separate recreational opportunities for wheeled motorized and non-motorized users. This would provide for increased enjoyment for non-motorized recreationists and enhanced road and trail safety among all users of the area.

Illegal activities (underage alcohol use, drug use, vandalism, unauthorized travel, and dumping) in the Scratchgravel Hills would be reduced due to closure of at least 60 percent of the roads to motorized use.

Since the Scratchgravel Hills have historically been open to motorized use, a substantial effort would be required to educate the public on its change in use. BLM would need to enforce road closures through law enforcement actions until such a time when motorized users conform

to the new restrictions. New signage would be required under all action alternatives; at designated trailheads, along roads and trails, and at other unauthorized access points originating from bordering private property.

Effects of Alternative B

Motorized wheeled travel would be restricted to four areas in the Scratchgravel Hills: routes leading to five non-motorized trailheads; a short out-and-back route off of Norris Road; a loop route between Head Lane and Echo Lane; and all existing public access rights-of-way. Roads in these four areas would be open yearlong. Alternative B would allow motorized use on 13.6 miles, about 26 percent of the number of open road miles under Alternative A. Alternative B would have 38.6 miles of closed roads that could serve as non-motorized trails, compared to none under Alternative A.

Motorized (wheeled) and non-motorized users would have separate routes and conflicts would be reduced compared to Alternative A. Route closures across 75 percent of the area would reduce unauthorized travel (illegal off-road use by ATVs and motorcycles) and illegal activities (underage alcohol use, drug use, vandalism, dumping) in the Scratchgravel Hills and elsewhere.

Cross-country snowmobile use would be allowed, as well as snowmobile travel on all existing routes during the season of use (12/2-5/15), conditions permitting. Conflicts between non-motorized users (cross-country skiers, snowshoers) and snowmobilers would be expected to continue or increase as a result.

The reduction in motorized use would enhance safety among users of the Scratchgravel Hills, compared to Alternative A because motorized and non-motorized users would likely be more segregated.

Closing the entire Scratchgravel Hills to motorized vehicle use after dark yearlong would result in a decrease in illegal activities (underage drinking, vandalism, dumping).

The extent of management activities and costs under Alternative B would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards). However, more effort on the part of the BLM would be required for public education and compliance. Estimated costs for road/trail maintenance would be less than under Alternative A.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would increase under Alternative B compared to Alternative A.

Effects of Alternative C

Alternative C would restrict wheeled motorized travel to five non-motorized trailheads in the Scratchgravel Hills.

This alternative would provide the least number of motorized routes in the Helena TPA (7.0 miles), which is about 85 percent fewer miles than Alternative A, and about 50 percent fewer miles than Alternative B.

This alternative would diminish the opportunity for motorized use of the Scratchgravel Hills, but would provide an extensive network of routes for enjoyment by non-motorized enthusiasts. Alternative C would have 15 percent more miles of closed roads that could serve as non-motorized trails than Alternative B, and would have more closed roads than any other alternative. Under Alternative C, no snowmobile use would be allowed, including on the trailhead access routes. This action would eliminate conflicts between snowmobilers and non-motorized winter users (cross-country skiing, snowshoeing).

Under Alternative C, unauthorized travel (illegal off-road use by ATVs and motorcycles) and illegal activities (underage drinking, vandalism, dumping) would be curtailed due to the restriction of motorized vehicles from the interior of the Scratchgravel Hills and closing the area after dark.

By eliminating motorized use within the interior of the Scratchgravel Hills there would be less potential for accident or injury resulting from conflict between user groups.

The five trailhead parking lots may need to be expanded to accommodate the number of vehicles bringing non-motorized users to the area. Since the Scratchgravel Hills have historically been open to motorized use, a substantial effort would be required to educate the public on its change in use. It is expected that the level of education and signage would be comparable to Alternative B, but less than required under Alternative A.

The extent of management activities and costs under Alternative C would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards). However, more effort on the part of the BLM would be required for public education and compliance. Estimated costs for road/trail maintenance would be the lowest of all the alternatives.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be the greatest under Alternative C than under any other alternative.

Effects of Alternative D

Alternative D would have 21.9 miles of open routes available for yearlong wheeled motorized travel (**Table-4-55**). This would be 58 percent less than under Alternative A, but 62 and 68 percent more than under Alternatives B and C, respectively. Road system projects would include reconstructing some segments and constructing new connector routes between other

segments. Through the development of interconnecting routes, motorized opportunities under Alternative D would be enhanced compared to Alternatives B and C. Non-motorized users would be accommodated through a network of routes that would be restricted from use by vehicles, ATVs and motorcycles, similar to Alternative B.

Under Alternative D, cross-country snowmobile use would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), snow conditions permitting. Conflicts between non-motorized users (cross-country skiers, snowshoers) and snowmobilers would be expected to continue or increase as a result.

Under Alternative D, illegal activities in the Scratchgravel Hills (underage alcohol use, unattended campfires, vandalism, dumping) are expected to be less than under Alternative A, but more than Alternatives B and C.

The extent of management activities and costs under Alternative D would be mixed. Less personnel time would be required to monitor travel compliance than under Alternatives B and C. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards). Estimated costs for road/trail maintenance would be higher than under the other action alternatives, but would be greater than under Alternative A.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be greater under Alternative D than under Alternative A, but less than under Alternatives B and C.

Cumulative Effects on Travel Management and Access

Under all alternatives, there are a number of past, present, and reasonably foreseeable BLM and non-BLM actions and activities affecting Travel management and access in the Helena TPA.

Like much of the west, the Helena Valley has been experiencing steady human population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. These factors could lead to increased public pressure to alter travel planning to accommodate more, or less motorized use.

The majority of BLM managed routes for the Helena Travel Planning area are located in or adjacent to the Scratchgravel Hills and Birdseye areas. Scratchgravel Hills is basically an island of undeveloped hills surrounded by residential development (there is some internal development as well). Residential development has tripled from 300 residential homes in 1984 to over 1,000 homes today. This combination of rapid urbanization and increased recreational use has led to

increased social conflict; between area residents and recreation users, and among recreational users themselves (motorized/non-motorized). As a result, there have been public demands to alter the existing travel management to reduce motorized use.

Recreation use is well established in the TPA. Primary recreation activities include motorized OHV uses (ATV, motorcycle) and non-motorized uses (hiking, jogging, horseback riding, mountain biking, etc.). As recreation use grows, conflicts between non-motorized and motorized recreation users could lead to increased public demands for either more, or less motorized use.

Portions of the TPA provide winter range for mule deer and elk. The Birdseye section is within a wildlife movement corridor that provides a connection between the Northern Continental Divide Ecosystem and the Greater Yellowstone Ecosystem, as well as local daily and seasonal movement between higher elevation summer ranges. Concerns could lead to the need to restrict motorized use.

In some site specific cases, visual resource management may affect or restrict new road/trail construction.

Urban development may lead to an increase in right-of-way permits to accommodate private property/development access. As a result, public access to BLM lands, via these rights-of-way, could increase as well.

Limits or reductions in the BLM's funding and ability to maintain designated routes could lead to an overall reduction in open road miles.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuels reduction projects, could affect travel management. Forest management activities from 1984 to present include 10 acres of forest planting and 133 acres of timber harvest. Wildland fire management activities from 1981 to 2004 include a fuels treatment (150 acres of fuels grinding) in the Scratchgravel Hills. Future projects include a 1,500-2,500 acre mechanical and/or prescribed fire treatment for the Scratchgravel Hills, anticipated to occur over a 5 year period. Depending on the type and scope of project, effects could vary from temporary, short-term area/route closures, to new opportunities (new routes) for motorized or non-motorized access.

The Scratchgravel Hills area contains precious and base metals in both hard rock and placer deposits. While presently, only a few mining claims are maintained on BLM lands, increases in mineral prices could lead to increased or renewed mining activity. Depending on the type and scope of mining activity, effects could vary from temporary, short-term area/route closures, to increased opportunities (new routes) for motorized or non-motorized access.

Noxious weeds and non-native invasive species are well established and spreading in the area. Motorized activities play a large role in the distribution of noxious weeds. Concerns over the spread of noxious weeds could influence travel management, and lead to fewer motorized opportunities.

Motorized use on dirt roads and trails is a major contributor to soil erosion and stream sedimentation. These concerns may influence travel management, and result in fewer motorized opportunities. This is an important consideration in the Helena area as the Montana Department of Environmental Quality is working on water quality restoration plans in the area.

Trash dumping, drug use, underage alcohol use, unattended camp fires, and vandalism occur throughout the travel planning area, but especially in the rural/urban interface areas. Most of these activities are directly associated with motorized use. Continuing concerns with illegal activities may influence travel management and lead to fewer motorized opportunities.

The National Guard manages approximately 8,000 acres of land (Fort Harrison) in the Helena City area. National Guard activities (helicopter landings, ground maneuvers, off-road travel, etc.) may influence travel management on adjacent BLM lands as well, exerting pressure for either more or less motorized access.

For perspective, BLM managed lands represent approximately 11 percent of the total travel planning area (95,492 total acres, 10,162 BLM acres); while BLM managed routes under Alternative A represent approximately 7.5 percent of the total routes available (693 total miles, 52.2 miles BLM roads/trails). Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, BLM routes available to motorized use in this TPA (especially the Scratchgravel Hills area) could experience increased use from displaced users, leading to more concentrated use, increased resource impacts, user conflicts, and pressure to reduce motorized use.

Under all alternatives, increases in human population, urbanization, recreation use, user conflicts; and concerns for wildlife, noxious weed spread, soil erosion/water quality, and illegal activities are likely to lead to increased demands to restrict motorized travel, particularly in areas with urban development, such as the Scratchgravel Hills. Under Alternative A, as urbanization continues around the Scratchgravel Hills, and both motorized (wheeled and snowmobile) and non-motorized use increases, these conflicts would increase. Under Alternative B, these pressures would have less impact on travel management than under Alternatives A and D, due to the overall reduction in motorized opportunities and separation of uses under Alternative B. Alternative C would be more beneficial to reducing

these conflicts in light of these pressures than all the other alternatives. Alternative D would lessen conflicts associated with these pressures, but not as much as Alternatives B and C. Both motorized and non-motorized users would have dispersed recreational opportunities under Alternative D.

TRANSPORTATION FACILITIES

For the sake of this discussion, "open" roads include roads that are open yearlong as well as those that are open with seasonal restrictions.

Effects of Alternative A

The Helena TPA would have 52.2 miles of open roads and no motorized trails (Table 4-56). Estimated costs for annual maintenance and stabilization of roads under Alternative A would be highest of all alternatives; almost three times more than under Alternatives B and D, and six times higher than under Alternative C. Estimated annual costs for both monitoring, compliance and weed control would be much higher under Alternative A than under the action alternatives.

Table 4-56 Helena TPA Route/Trail Annual Maintenance Costs				
Classification/ Cost	Alt A	Alt B	Alt C	Alt D
Miles of Open/ Restricted Roads	52.2	13.6	7	21.9
Motorized Trails	0	0	0	0
Annual Road Maintenance	\$4,176	\$1,088	\$560	\$1,752
Annual Trail Maintenance	\$0	\$0	\$0	\$0
Periodic Road Stabilization	\$1,670	\$435	\$224	\$701
Periodic Trail Stabilization	\$0	\$0	\$0	\$0
Monitoring/ Compliance	\$2,610	\$680	\$350	\$1,095
Weed Control	\$783	\$204	\$105	\$329

Effects of Alternative B

Under Alternative B, the Helena TPA would have 13.6 miles of open roads and no motorized trails (Table 4-56). Estimated costs for annual maintenance and stabilization of roads under Alternative B would be less than under Alternatives A and D, and more than under Alternative C.

Estimated annual costs for monitoring, compliance and weed control would also be less than under Alternatives A and D, but more than under Alternative C.

Restricting motorized access to the Scratchgravel Hills area to five existing non-motorized trailheads would result in an increase in transportation facility costs for trailhead maintenance and signage. Closing the Scratchgravel Hills to motorized vehicle use after dark would result in a short-term increase in facility costs for installing signs and gates at appropriate access points and a long-term increase in cost for sign maintenance. Effects of this alternative associated with the Scratchgravel Hills nighttime closure would be similar to Alternative C.

Effects of Alternative C

Under Alternative C, the Helena TPA would have 7 miles of open roads and no motorized trails (Table 4-56). Estimated costs for annual maintenance and stabilization of roads under Alternative C would be the least of all the alternatives due to the least number of motorized routes. Estimated annual costs for monitoring, compliance, and weed control would also be less than the other alternatives.

Closing the Scratchgravel Hills to motorized and non-motorized vehicle use after dark would result in a short-term increase in transportation facility costs for installing signs and gates at appropriate access points and a long-term increase in cost for personnel and sign maintenance. Effects of this alternative associated with the Scratchgravel Hills nighttime closure would be the same as under Alternative B.

Effects of Alternative D

Under Alternative D, the Helena TPA would have 21.9 miles of open roads and no motorized trails (Table 4-56). Estimated costs for annual maintenance and periodic stabilization of roads under Alternative D would be greater than under Alternatives B and C, but less than under Alternative A. Estimated annual costs for monitoring, compliance and weed control would be less under Alternative D than under Alternative A and more than under Alternatives B and C.

Constructing new connector routes and reconstructing several existing routes would result in a short-term increase in transportation facility costs for signage, and potentially for additional culverts, and a long-term increase for route maintenance.

LANDS AND REALTY

Effects Common to All Alternatives

The Butte Field Office administers approximately 57 rights-of-way (ROW) and 1 non-commercial occupancy lease within the boundaries of the Helena TPA, which encumber approximately 481 acres of BLM land (Table 4-57).

Table 4-57
Helena TPA ROWs/Leases

Type	Approximate Number	Approximate Acres
Roads	26	359
Power	8	9
Telephone	12	11
O&G Pipelines	6	96
Comm. Sites	0	0
2920 Leases	1	1
Other	5	5
Totals	58	481

Various types of road rights-of-way (ROW) are the most common type of grant, accounting for 44 percent, or just under half of the total. Other types of authorized uses include: oil and gas pipelines, lines for electrical distribution and telephone facilities, ditches, railroads, and mineral material sites.

Approximately three right-of-way applications for new facilities as well as amendments, assignments, renewals, or relinquishments of existing right-of-way grants are processed annually in the TPA. This would not vary by alternative.

The general trend of granting rights-of-way is expected to increase through the planning period as a result of increasing public demands. From a cumulative effects standpoint, development of adjacent federal, state, and private land, increased recreational use and the trend of homeownership away from urban areas, coupled with traditional on-going uses, are all expected to require more guaranteed access involving public land, including BLM lands in this TPA.

SPECIAL DESIGNATIONS

There would be no effects to any special designation areas such as Wild and Scenic Rivers, Wilderness Study Areas, or Areas of Critical Environmental Concern under any of the travel plan alternatives for the Helena TPA. No areas with special designations are located within the Helena TPA.

EAST HELENA TPA

The 200,991-acre East Helena TPA contains 20,039 acres of BLM lands. There are approximately 71 miles of BLM road, making up about 8 percent of the approximate total of 892 road miles in the TPA. The majority of roads (690 miles) lie on private lands.

SOILS

Effects Common to All Alternatives

Road construction, use, and maintenance affect soils in a number of ways. Soils are often compacted by these activities. Soil compaction can lessen the amount of

precipitation that can infiltrate into soil and increase runoff, erosion, and sedimentation – in turn decreasing soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.

Closing or decommissioning roads often leads to beneficial effects to soils through decreased site disturbance and re-establishment of vegetative cover on road surfaces. This tends to reduce soil erosion and stabilize soils. Decommissioning roads may in some cases entail ripping road surfaces to de-compact them, thus improving water infiltration, hydrologic function, and the ability of the treated area to revegetate more successfully.

Impacts to soils associated with site-specific travel plan alternatives were assessed based on the potential for soil erosion using the following erosion risk criteria:

- High – the area a route travels through has slopes greater than 30 percent gradient.
- Moderate – the area a route travels through has slopes ranging from 15 to 30 percent gradient; or, for granitic soils, slopes ranging from 0 to 30 percent gradient.
- Low – the area a route travels through has slopes ranging from zero to 15 percent gradient and soils are not granitic in origin.
- Unrated – road mapping not available at time of erosion impact rating.

Effects of the Alternatives

The distribution of road miles by erosion risk category and by proposed road management category by alternative is shown for the East Helena TPA in **Table 4-58**. Roads in the “unrated” category were excluded from detailed consideration and are shown for the purpose of displaying the extent of lacking information.

Under current conditions (Alternative A) approximately 6.9 miles of open BLM roads are located in areas with high erosion risk, and 23.3 miles are in moderate erosion areas. Soil erosion would be reduced under Alternative B because this alternative would reduce those open road mileages in high and moderate erosion categories to 6.8 miles and 6.4 miles, respectively. Approximately 34.9 miles of road in the high and moderate classes combined would be closed under Alternative B with an additional 4.5 miles in these categories being decommissioned. This should allow vegetative recovery on these areas and further reduce soil erosion.

Under Alternative C, soil erosion from roads would be reduced more than under any other alternative because the lowest mileage of roads in the high and moderate erosion categories would be left open (4.6 miles combined), while the greatest mileage in these categories combined would be closed (43.9 miles) and decommissioned (4 miles) of all alternatives.

Table 4-58
BLM Road Miles in Soil Erosion Impact Categories by Alternative for the East Helena TPA
 (mileages are GIS-generated estimates)

Proposed Road Management	Erosion Risk Category	Alternative A	Alternative B	Alternative C	Alternative D
Open Road Miles (including Open w/restrictions)	High	6.9	6.8	0.8	7.1
	Moderate	23.3	6.4	3.8	18.0
	Low	9.1	7.6	5.2	9.0
	Unrated	2.8	1.2	0.1	1.8
Closed Road Miles	High	6.8	5.8	12.0	5.7
	Moderate	15.5	29.1	31.9	18.8
	Low	3.9	5.3	7.8	3.9
	Unrated	0.2	1.7	2.9	1.2
Decommissioned Road Miles	High	0	1.2	1.0	1.0
	Moderate	0	3.3	3.0	1.9
	Low	0	0	0	0.1
	Unrated	0	0.1	0	0

Note: Open roads include seasonally open roads as well as roads open yearlong.

Soil erosion associated with roads would be reduced under Alternative D compared to Alternative A, but would still be higher than under either Alternative B or C. Approximately 25.1 miles of BLM road in the moderate and high erosion categories combined would remain open under Alternative D, while about 24.5 miles in these categories would be closed and 2.9 miles would be decommissioned under this alternative.

Cumulative Effects on Soils

Cumulative effects to soils in the East Helena TPA would arise from many past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 200,991-acre TPA, BLM lands comprise about 20,039 acres or 10 percent of total lands. The approximately 71 miles of BLM roads make up about 8 percent of the approximately 892 road miles in the TPA. Therefore road-related effects to soils described by alternative for BLM roads would affect about 8 percent of all roads in the TPA. The majority of lands and roads within the TPA boundary are private property. Non-BLM roads are managed by the local counties, Forest Service, state, Bureau of Reclamation, and private landowners.

Approximately 1,609 BLM acres are permitted for various rights-of-way and leases. About 746 of these acres are for specific road rights-of-way. The remaining 863 acres are associated with power lines, waterlines, railroads, communication sites, and other utility facilities. Impacts to soils range from compaction and occupation of ground with buildings, roadbeds, railroad tracks, and other facilities, to revegetation and ground cover being re-established to stabilize soils.

Since 1981 wildland fires have burned across approximately 15,577 acres in the East Helena TPA. The majority of these acres (15,535) burned in 2000 across a mixture of land ownerships. The fire burned with variable severity creating a mosaic of effects to soils. More severely burned areas underwent more severe erosion than areas burned less severely. Fire rehabilitation activities such as reseeding with grasses/herbaceous species, contour felling of trees/snags in severely burned areas to trap sediment, waterbarring of firelines, and post-fire noxious weed treatments helped minimize soil loss due to post-fire erosion. Tree planting on approximately 250 BLM acres (in 2002) of this burned area have contributed to longer term soil stabilization.

From 1995 to the present, timber salvage has occurred on approximately 250 acres of BLM land in this TPA. Adverse effects on soils were minor with treated areas having undergone revegetation and soil stabilization since treatment. Timber harvest has also occurred on private and Forest Service lands and will likely continue into the foreseeable future. These activities will have localized impacts (compaction, erosion) on soils.

While there have been no hazardous fuels treatment projects here in the last 10 years, BLM anticipates treating approximately 500 to 1,500 acres within this TPA to reduce hazardous fuels in Wildland Urban Interface areas within the next several years. Treatments would consist of mechanical and/or prescribed fire treatments. Effects to soils would likely be variable but for the most part would be minor. Prescribed burns would occur under prescriptions to minimize fire severity and impacts to soils. Mechanical treatments would be designed to minimize ground disturbance that

could facilitate compaction or erosion. Fuels treatments conducted on private and Forest Service lands will also likely occur for the foreseeable future with variable effects to soils. Reducing fuels under the controlled conditions of deliberate treatments may benefit soils in the long-term by reducing the risk of high severity fires in treated areas.

Livestock grazing on public and private lands throughout much of the TPA has created areas of localized soil erosion and compaction, especially in grassland and shrubland areas. This will continue to occur for the foreseeable future.

Increasing residential development will likely continue for the foreseeable future. Erosion, compaction, and covering of soils would occur due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments.

Under Alternative A, the contribution to cumulative effects on soils from BLM road management would continue as it occurs today. Retaining approximately 36 miles of road open yearlong and an additional approximately 7 miles open with a seasonal restriction of 10/15 to 12/1 would allow for the same level of compaction and erosion impacts that currently exist.

From a BLM road management perspective, all action alternatives would benefit soil resources compared to Alternative A. Alternative B would benefit soils by providing for a reduced contribution to adverse cumulative effects than would Alternative A because about 68 percent of BLM roads would be closed or decommissioned under Alternative B (compared to 39 percent under Alternative A). Of the approximately 22 miles of open road, nearly one half of them (about 10 miles) would be seasonally restricted to exclude motorized vehicle use in the wet spring runoff period each year. This would reduce erosion from these BLM roads.

Alternative C would benefit soils the most and provide for the least contribution to adverse cumulative effects of all alternatives. This alternative would provide for closure or decommissioning of about 86 percent of BLM roads in the TPA, thus allowing these areas to vegetatively recover and stabilize soils.

Alternative D would provide for the greatest contribution to adverse cumulative effects on soils of the action alternatives, but would still provide for greater long-term benefits to soils than Alternative A. Alternative D would provide for closure or decommissioning (and therefore vegetative recovery and soil stabilization) of about 48 percent of BLM roads in the TPA, compared to 39 percent for Alternative A, 68 percent for Alternative B, and 86 percent for Alternative C.

Due to the scattered distribution and relatively small proportion of BLM lands (10 percent) and roads (8 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on soils at the scale of the entire East Helena TPA.

WATER RESOURCES

Effects Common to All Alternatives

There are a number of key concepts that are critical to understanding road effects to water resources.

Hydrologic function is an interaction between soil, water, and vegetation. It reflects the capacity of a site to:

- Capture, store, and safely release water from rainfall, runoff, and snowmelt;
- Resist a reduction in this capacity; and
- Recover this capacity following degradation.

Interception of precipitation results when precipitation falls on vegetation. When vegetation is removed, precipitation falls directly on the soil. This can increase surface erosion and sedimentation, and decrease the amount of time between initial precipitation arrival and peak surface runoff – in turn decreasing soil/site stability and hydrologic function. Roads remove vegetation and therefore decrease interception of precipitation.

Infiltration is the process of precipitation entering and traveling through soil. Infiltration reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. Infiltration also filters precipitation and reduces erosion and sedimentation. If infiltration is reduced, runoff and erosion will increase and hydrologic function will decrease. Generally, roads are compacted surfaces that have decreased infiltration, thus increasing runoff and potentially increasing erosion.

Runoff can affect the amount of erosion and sedimentation, as well as flooding – both onsite and offsite. If runoff is increased, all of these effects can increase with a result that water quality and hydrologic function will decrease.

Increased sediment entering waterbodies increases turbidity, increases width-to-depth ratios, and consequently increases temperature and dissolved oxygen saturation levels, and creates adverse habitat for aquatic animals and plants.

Alteration of flow routing can also affect water resources. For example, roadcuts into areas with relatively shallow groundwater can intercept groundwater, bring it to the surface, and transport it some distance (i.e. in a roadside ditch) before delivering it to a stream. This can lead to erosion of road ditchlines and subsequent sedimentation of streams during runoff

periods, or increased thermal loading of water before delivery to streams during summer periods.

Closure and decommissioning of roads tend to reduce erosion and sedimentation effects stemming from roads on water quality. On an equivalent road mile basis, decommissioning roads would benefit water quality to a greater degree than closing roads because the decommissioning process would often entail implementing measures to restore hydrologic function. During road decommissioning, items such as compaction, drainage, stream crossing culverts, and ground cover are often addressed in a manner that markedly improves hydrologic function. These features are not fully addressed on roads that are merely "closed". However, the reduced disturbance on newly closed roads combined with the tendency for revegetation to re-establish ground cover on them, reduces erosion and subsequent sedimentation effects to water quality.

Effects of the Alternatives

Generally, road density is an indicator of overall watershed health and function. Watersheds with higher road densities tend to have lower water quality due to greater disruption of hydrologic function (described above), and potential for erosion and subsequent sedimentation. Road density also is related to the distribution and spread of noxious weeds.

Table 4-59 shows acres of BLM land in three road density categories by alternative for the East Helena TPA. These data reflect differences between alternatives based on roads proposed for "decommissioning" by alternative. While many "closed" roads would gradually contribute to increased hydrologic function over time, decommissioned roads would more directly contribute to hydrologic function because measures aimed at restoring hydrologic function would likely be part of the treatment during decommissioning. Alternative A would have the greatest amount of BLM land with "high" road densities of greater than 2 mi/mi². Alternative B would have the lowest acreage in the high category with the greatest acreage in the low category of all alternatives. Alternatives C and D would be similar but Alternative C would have the next lowest acreage in the high road

density category while Alternative D would have more acres in the high category than either Alternative B or C, but less than Alternative A. Overall, all the action alternatives would improve hydrologic function but by this measure Alternative B would make the greatest contribution to improved hydrologic function of all the alternatives.

Table 4-59 Acres of BLM land in road density categories by alternative for the East Helena TPA			
TPA	Road Density Category		
	Low (<1 mi/mi ²)	Moderate (1 to 2 mi/mi ²)	High (> 2 mi/mi ²)
Alt. A	5,969	4,665	9,317
Alt. B	6,557	4,457	8,936
Alt. C	6,500	4,384	9,066
Alt. D	6,502	4,353	9,096

Motorized routes within 300 feet of streams generally have greater potential to directly impact water quality through erosion and sedimentation, increased water temperatures (due to loss of shading vegetation), and direct alteration of stream channel morphology than those farther away. **Table 4-60** shows the miles of open and closed roads on BLM lands within 300 feet of streams by alternative. Under Alternative A there are about 7 miles of open road within 300 feet of streams. All action alternatives would improve water quality by closing or decommissioning roads in close proximity to perennial streams. Alternative C would create the most benefit followed closely by Alternative B, then Alternative D.

Although the benefits to water resources are fairly similar between alternatives, overall Alternative C would contribute the most benefits to water resources of all alternatives, followed by Alternative B, Alternative D, then Alternative A which would retain the same effects as currently exist.

Cumulative Effects on Water Resources

Cumulative effects to water resources in the East Helena TPA would arise from many past, present, and

Table 4-60 Miles of Open and Closed Roads on BLM Lands within 300 ft. of Fish-Bearing Streams and Perennial, Non-Fish-Bearing Streams by Alternative for the East Helena TPA				
	Perennial Fish-Bearing Streams		Perennial Non-Fish-Bearing Streams	
	# Open Road Miles	# Closed Road Miles	# Open Road Miles	# Closed Road Miles
Alt. A	0	0.4	2.0	0.7
Alt. B	0	0.4	0.9	1.8
Alt. C	0	0.4	0.7	2.0
Alt. D	0	0.4	1.0	1.7

Note: Open roads include seasonally open roads as well as roads open yearlong. Closed roads include decommissioned roads.

reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 200,991-acre TPA, BLM lands comprise about 20,039 acres or 10 percent of total lands. The approximately 71 miles of BLM roads make up about 8 percent of the approximately 892 road miles in the TPA. Therefore road-related effects to water resources described by alternative for BLM roads would affect about 8 percent of all roads in the TPA.

There are approximately 171 miles of perennial non-fish bearing streams and 100 miles of fish bearing streams in the TPA. Of these, there are about 7.6 miles of perennial non-fish bearing streams and 1 mile of fish bearing stream on BLM lands. The majority of lands and roads within the TPA boundary are private property. Non-BLM roads are managed by the local counties, Forest Service, state, Bureau of Reclamation, and private landowners.

Approximately 1,609 BLM acres are permitted for various rights-of-way and leases. About 746 of these acres are for specific road rights-of-way. The remaining 863 acres are associated with powerlines, waterlines, railroads, communication sites, and other utility facilities. Impacts to water resources are generally minor with some localized erosion and sedimentation and some contribution to decreased hydrologic function (decreased infiltration, increased runoff) due to compaction.

Since 1981 wildland fires have burned across approximately 15,577 acres in the East Helena TPA. The majority of these acres (15,535) burned in 2000 across a mixture of land ownerships. The fire burned with variable intensity and severity creating a range of effects to water resources. In burned areas, nutrient inputs to streams increased (perhaps for several years). Streams in more severely burned areas (some near Canyon Ferry Reservoir) underwent more severe erosion and sedimentation than those in areas burned less severely. Water temperatures in some streams may have increased due to loss of stream-side shade from the fires. Wood recruitment to streams in forested areas of high burn intensity may be increasing due to riparian tree mortality from fires. Stream flows may increase in some streams for several years. Peak flows may increase due to reduced snow interception by vegetation resulting in greater snow accumulations available for snowmelt in warmer periods. Summer flows may increase due to a lack of live vegetation to conduct evapotranspiration of water so more groundwater may reach stream channels. Fire rehabilitation activities such as reseeding burnt ground with grasses/herbaceous species, contour felling of snags in severely burned areas to trap sediment, waterbarring of firelines, and post-fire noxious weed treatments helped stabilize soils and minimize sedimentation effects to streams due to post-fire erosion. Tree planting on approximately 250 BLM acres (in 2002) of this burned area have contributed to longer term soil stabilization and subsequent reduction of stream sedimentation.

From 1995 to the present, timber salvage has occurred on approximately 250 acres of BLM land in this TPA. Adverse effects on water resources were minor to negligible from this activity. Timber harvest has also occurred on private and Forest Service lands and will likely continue into the foreseeable future. Ground disturbance from these activities will have localized impacts to water resources including some sedimentation, loss of woody material recruitment for streams, and potential water temperature increases due to shade loss.

While there have been no hazardous fuels treatment projects here in the last 10 years, BLM anticipates treating approximately 500 to 1,500 acres within this TPA to reduce hazardous fuels in Wildland Urban Interface areas within the next several years. Treatments would consist of mechanical and/or prescribed fire treatments. Prescribed burns would occur under prescriptions to minimize fire severity and impacts to soils and desirable vegetation, thereby minimizing effects to hydrologic function. Mechanical treatments would be designed to minimize ground disturbance that could facilitate compaction or erosion. These project design measures would minimize potential erosion/sedimentation effects to water resources. Fuels treatments conducted on private and Forest Service lands will also likely occur for the foreseeable future with variable effects to water resources. Reducing fuels under the controlled conditions of deliberate treatments may benefit water resources in the long-term by reducing the risk of future high severity fires that could have severe adverse effects on water resources in treated areas.

Livestock grazing on BLM land, other public and private lands throughout much of the East Helena TPA has created areas of localized streambank trampling, soil erosion and compaction, and nutrient inputs to streams. In severe cases stream channel morphology may be altered due to severe loss of riparian vegetation, loss of streambank integrity, channel widening and shallowing, and substantial sediment inputs. These effects to water quality will continue to occur for the foreseeable future. Agricultural water withdrawals occur on private lands in this TPA. These withdrawals reduce stream flows in the TPA, including within Prickly Pear Creek, one of two streams that flows through BLM lands and is listed as an impaired water body by MDEQ.

Increasing residential development will likely continue for the foreseeable future to variable degrees within the TPA. Impairments to hydrologic function such as erosion, soil compaction, and runoff would likely increase due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments. Nutrient, chemical pollutant, and pathogen inputs to streams would also likely increase due to leaching from septic systems, urban runoff (fertilizer, chemicals, and petroleum pollutants), and waste from livestock.

Damming of the Missouri River to create Holter Lake, Hauser Lake, and Canyon Ferry Reservoir dramatically altered water resources. Approximately 40 miles of the Missouri River were converted into lake habitat, dramatically altering water quality and quantity.

Canyon Ferry Reservoir and the Missouri River from Canyon Ferry Dam to Hauser Lake are both identified as impaired water bodies on the MDEQ 303(d) list. Canyon Ferry Reservoir has impairments related to excess nitrogen and ammonia as well as excess algal growth, likely related to municipal point source discharges, septic systems, agriculture, and abandoned mine lands. Canyon Ferry also has excessive arsenic and thallium attributed to contamination from abandoned mine lands. Missouri River from Canyon Ferry Dam to Hauser Lake has impairments primarily related to excessive nutrients and dissolved oxygen deficiency. These impairments are attributed to dam construction, grazing in riparian or shoreline zones, municipal point source discharges, and septic systems. These impairments will continue into the foreseeable future although ongoing efforts are gradually addressing some of them.

Hauser Lake (3,800 acres) is listed as impaired on the 303(d) list due to pesticide contamination, mercury, and dissolved oxygen impairments attributed to agriculture, silvicultural activities, natural sources (mercury), impacts from hydrostructure flow regulation, and highway/road/bridge runoff. Holter Lake (5,500 acres) is listed as impaired on the 303(d) list due to mercury contamination attributed to placer mining, inappropriate waste disposal, abandoned mine lands, historic bottom deposits, and atmospheric deposition. Lake Helena (1,600 acres) is listed as impaired on the 303(d) list due primarily to heavy metal contamination attributed to acid mine drainage, abandoned mine lands, hydrostructure flow regulation, irrigated crop production, and natural sources. All of these impairments in these reservoirs will continue for the foreseeable future although ongoing efforts are gradually addressing some of them.

Bureau of Reclamation manages the Canyon Ferry Reservoir and Dam on the Missouri River. The reservoir (35,200 acres, 76 miles of shoreline perimeter) is operated to provide flood control, power generation, irrigation, municipal water, and to enhance recreation, fish, and wildlife benefits. The reservoir is generally managed to stabilize downstream flows. By preventing flows from becoming too low, this management tends to minimize potential further water resource concerns during summer periods.

Pennsylvania Power and Light of Montana manages water flows through Hauser and Holter Lake dams in close coordination with the Bureau of Reclamation at Canyon Ferry upstream. Hauser and Holter Lakes are managed as full-pool, run-of-the-river reservoirs as per FERC re-licensing completed in 2000. Flows are managed to optimize energy production, provide for water right uses, and maintain appropriate conditions for

fisheries, wildlife, and recreation values. By preventing flows from becoming too low, this management tends to minimize potential further water resource concerns during summer periods.

Under Alternative A, the contribution to cumulative effects on water resources from BLM road management would continue as it occurs today. Retaining approximately 36 miles of road open yearlong and an additional approximately 7 miles open with a seasonal restriction of 10/15 to 12/1 would allow for the same level of effects on water resources that currently exist.

From a BLM road management perspective, all action alternatives would benefit water resources compared to Alternative A. Alternative B would benefit water resources by providing for a reduced contribution to adverse cumulative effects compared to Alternative A because about 68 percent of BLM roads would be closed or decommissioned under Alternative B (compared to 39 percent closed under Alternative A). Of the approximately 22 miles of open road under Alternative B, nearly one half of them (about 10 miles) would be seasonally restricted to exclude motorized vehicle use in the wet spring runoff period each year. This would reduce erosion from these BLM roads and further benefit water resources.

Although the greatest road mileage would be decommissioned under Alternative B (4.7 miles), Alternative C would likely benefit water resources the most and provide for the least contribution to adverse cumulative effects on water resources of all alternatives. This alternative would provide for closure or decommissioning of about 86 percent of BLM roads in the TPA (compared to about 68 percent for Alternative B), thus allowing these areas to vegetatively recover, stabilize soils, and reduce erosion.

Alternative D would provide for the greatest contribution to adverse cumulative effects on water resources of the action alternatives, but would still provide for greater long-term benefits to water resources than Alternative A. Alternative D would provide for closure or decommissioning (and therefore vegetative recovery, soil stabilization, and reduced erosion/sedimentation) on about 48 percent of BLM roads in the TPA, compared to 39 percent for Alternative A, 68 percent for Alternative B, and 86 percent for Alternative C.

Due to the scattered distribution and relatively small proportion of BLM lands (10 percent) and roads (8 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on the streams and reservoirs in the East Helena TPA on the whole.

VEGETATIVE COMMUNITIES – FOREST RESOURCES AND FOREST AND WOODLAND PRODUCTS

Effects of the Alternatives

Under all alternatives, existing roads and roads built to access timber and forest product sales on BLM lands may encourage timber harvest and forest product sales on adjacent lands, particularly where landowners and other agencies looking to improve economic efficiency or opportunities in the management on their lands.

In general, vegetative treatment contractors tend to bid more readily on projects in areas with vehicle access or valuable products. BLM often prioritizes forest vegetation management activities such as forest products and forest protection activities (e.g. wildfire suppression and forest insect and disease control) in similar areas.

Rehabilitation of roads (decommissioning and in some cases road closure) would revegetate currently unvegetated roadbeds, which would increase vegetation biomass production on the landscape through colonization of sites with grasses, forbs, shrubs, and trees. Increases in revegetated area would occur at a rate of approximately 1.5 to 3 acres per mile of rehabilitated road. Eventually rehabilitated roads would support plant communities consistent with site potentials which would help resist weed invasions. However, road closures and removals (decommissioning) could make vegetation management treatments more difficult and costly, thereby inhibiting proposed treatments, reducing public access for product use and removal, and potentially slowing fire detection and suppression.

Under Alternative A where 37 percent of the existing roads have been historically closed, there would be no increase in project analysis and implementation costs. However, under Alternative B approximately 50 percent of roads into forested areas would be closed. Under Alternative C about 83 percent of roads into forested areas would be closed, while under Alternative D about 46 percent of these roads would be closed. These closures would result in commensurate potential increases in vegetative analysis and treatment costs by alternative. These potential cost increases would need to be considered on a case by case basis by the BLM during project feasibility determinations, and additional funding may be needed to analyze and implement the projects that would remain feasible. Road closures could also result in potential decreases in quantities of forest products removed. The extent of the effects described above would be minimized because BLM would likely still be able to plan and implement projects in many areas on closed roads through the variance process for temporary road use. Road-related effects would be greatest under Alternative C, followed in sequence by Alternative B, then Alternative D.

Roaded access to forested areas would also affect the gathering of firewood and other forest products by the general public. Most public parties prefer to drive close to areas of product removal so they do not have to carry products over long distances to their vehicles. There have been few publicly requested small sales of materials in most areas of this TPA. Requests received have concentrated mainly where the lands are crossed by main access routes or in the vicinity of mining claims and homes. The requests received have generally been few due to the preponderance of pine trees which are generally considered to be low quality firewood and Christmas trees. It is likely that local requests for products would continue as has occurred in the past. For the East Helena TPA, Alternative A would retain the most public opportunities for these activities, followed in sequence of decreasing opportunities by Alternative D, Alternative B, then Alternative C. Alternatives B and D would have similar effects to public access for forest product gathering. Under the action alternatives, public searching for, and removal of personal use and small products would generally be confined to motorized travel corridors along the main roads.

Cumulative Effects on Forest and Woodland Resources and Products

No BLM forest health/silvicultural treatments or resource product removal projects are currently scheduled in this TPA within the next five years. Fuels reduction projects with forest health considerations have a high priority in general and would likely occur in this area in the future due to the close proximity of wildland urban interface areas adjacent to several blocks of BLM lands. The major blocks of BLM forest and woodlands in this TPA are located in the North Hills, the Ward Ranch area by Hauser Lake and the Spokane Hills west of Canyon Ferry Lake. These generally contain stands of low productivity and commercial value as in the northern portions of the North Hills and the Spokane Hills (approximately 40 percent of BLM lands in the TPA) where wildfire has severely damaged the forest and woodland stands over the last 25 years. The formerly privately-owned Ward Ranch area has undergone commercial logging that has removed the larger trees since the early 1900s. The products from the forested areas in this TPA would provide little revenue in timber sale projects. In other vegetation manipulation projects, derived products would provide only small offsets to costs for stewardship projects where goods are exchanged for services.

There would be little cumulative effect from any of the action alternatives to forest management activities on inholding and adjacent private lands, as many of the proposed closed roads end in public lands along the shores of the Missouri River and the Lakes. Those roads used for main access to private lands would continue to provide vehicular access through BLM lands under all alternatives for personal use or authorized purposes for

the landowners. Projects on private lands would promote fuels reduction objectives in the area as well.

Forested vegetation on BLM lands would also be affected by approximately 1,609 acres of rights-of-way and leases on BLM land. Forested vegetation located in these areas usually is harvested and/or removed to accommodate the necessary access or facilities. Forest vegetation removal would occur on new authorizations in the future and would occur as necessary to maintain sight distances and safety clearances associated with roads and facilities.

Urbanization is expected to continue on the 128,048 acres of private lands (64 percent of total acreage) within this TPA. Forest products are commonly removed from these areas prior to permanent construction. Urbanization is likely to continue in the future and will affect forested vegetation at an unknown rate. As private construction increases, miles of road on private will most likely increase from the current 690 miles.

Risk to forests from human-caused wildfires is commonly associated with miles of open roads. Risk to forests from wildfire is greatest under Alternative A with 44.3 miles of open roads. Alternative B would have less risk of human-caused fire starts with about 17 miles of open road during summer months. Alternative C would have the least risk to public forests with only 12.0 miles of road open during summer months. Alternative D (38 miles of open road during summer) would have more risk than either Alternatives B or C, but less risk than Alternative A. Given that the majority of roads in the TPA (92 percent) are non-BLM roads, this contribution to reduced fire risk from BLM roads in the action alternatives is relatively small in the context of the entire TPA.

Since BLM roads constitute only 8 percent of all roads in this TPA, and BLM lands make up only 10 percent of all lands in the TPA, urbanization and activities on open non-BLM roads in the vicinity may have more cumulative effects on forested vegetation in the TPA than BLM decisions regarding miles of open and closed road.

VEGETATIVE COMMUNITIES – NOXIOUS WEEDS

Under all alternatives, any snowmobile use would have negligible effects on noxious weed spread and populations. Invasive noxious weeds and non-native species are degrading wildland health. These are aggressive plants that can outcompete many native plants, as they have few natural enemies to keep them from dominating an ecosystem. These plant species are spread by many means. However, any land disturbing activity in the TPA has the most potential to introduce and spread weed species. Motorized vehicles are one vector for noxious weed spread as weed seed becomes attached to vehicles and their tires, and are transported

from one area to another where seeds become detached and germinate to inhabit new areas.

Effects of Alternative A

Under Alternative A, a total of 44.3 miles of wheeled motorized routes are open (36.6 miles open yearlong, 7.7 miles seasonally restricted, 26.4 miles closed). With the exception of the Ward Ranch, McMasters, and Spokane Hills temporary area closures, the remainder of the travel planning area would remain available to cross-country area snowmobile use, as well as travel on all existing routes during the season of use (12/2-5/15), conditions permitting.

Alternative A would leave the most roads open and in turn would promote the greatest amount of weeds and other undesirable plant spread and production of all alternatives. More herbicide control would be needed to control weeds than under the other alternatives. Under Alternative A the 44.3 miles of open BLM road would make up about 4 percent of all open roads in the East Helena TPA.

Effects of Alternative B

Under Alternative B, 13.7 miles of wheeled motorized routes would be available yearlong, and 3.3 miles would be open with seasonal restrictions. Cross-country snowmobile travel would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), except for the North Hills, Dana's Bar, and the area located to the west of Prickly Pear Creek. The remainder of the travel planning area (McMaster Hills, Ward Ranch, and Spokane Hills) would be closed to all cross-country snowmobile use, including travel on existing roads and trails. This alternative would close 41.9 miles of road leaving 13.7 miles open yearlong as compared to 36.6 miles of road open yearlong under Alternative A. This would prevent weed spread caused by motorized vehicles on closed routes, but would increase weed spread on open routes because of the more concentrated use on the fewer available routes. Overall Alternative B would reduce weed spread, but would increase weed treatment costs per road mile on remaining open roads compared to Alternative A. Under Alternative B the 13.7 miles of BLM road open yearlong along with the 3.3 miles of seasonally restricted road would make up about 2 percent of all open roads in the East Helena TPA.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized access in the East Helena travel planning area. Under Alternative C, 12.0 miles of wheeled motorized routes would be available yearlong. No cross-country snowmobile use would be allowed; use would be restricted to designated routes only during the season of use (12/2-5/15), snow conditions permitting. This alternative would close 54.6 miles of road leaving

12.0 miles open yearlong as compared to 36.6 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase weed spread on open routes because of the more concentrated use on the fewer available road miles. Overall Alternative C would reduce weed spread more than any other alternative, but would increase weed treatment costs per road mile on the remaining open roads compared to Alternative A. Under Alternative C the 12 miles of open BLM road would make up about 1 percent of all open roads in the East Helena TPA.

Effects of Alternative D

Alternative D would provide the highest level of motorized access (of the action alternatives), and the least non-motorized opportunities. Under Alternative D, 36.0 miles of wheeled motorized routes would be available yearlong, and 1.9 miles would be open with seasonal restrictions. Snowmobile management under this alternative would be as follows: cross-country travel would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), for the North Hills, Dana's Bar, and the area located to the west of Prickly Pear Creek. The Ward Ranch and the Big Bend areas would be closed to all cross-country snowmobile use as well as travel on designated routes. This alternative would close 29.7 miles of road, leaving 36.0 miles open yearlong as compared to 36.6 miles of road open yearlong for Alternative A. This alternative would have very similar environmental effects as Alternative A, though to a slightly lower degree. Under Alternative D the open BLM roads would make up about 4 percent of all open travel routes in the East Helena TPA.

Cumulative Effects on Noxious Weeds

Under all alternatives, other past, present, and reasonably foreseeable future BLM and non-BLM actions and outside influences affect noxious weeds.

Recreation use is well established in the TPA. Primary recreation activities include water based activities, big game hunting, non-motorized uses (hiking, jogging, horseback riding, mountain biking, etc), and OHV uses (ATV, motorcycle). Motorized recreation uses are one of the leading causes of introduction and spread of noxious weeds and non-native species. Weed seeds are transported by many recreational vectors such as water recreation uses, motorized vehicles including their tires, non-motorized vehicles including their tires, pack animals, and humans.

Urban development may lead to an increase in right-of-way permits to accommodate private property/development access. As a result, soil disturbing activities (i.e. roads, power lines, telephone lines, etc.), will increase causing weeds to increase.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuels reduction projects, could affect weeds in the TPA. There have been no fuels treatments in this area in the last 10 years. There are as yet unplanned fuels treatments potentially slated for planning and implementation over the next five years for this area, mainly in the area of the North Hills. These treatments would consist of mechanical and/or prescribed burning from 500 to 1,500 acres focused on the urban interface areas. Any project creating soil disturbance has the capability to increase weedy plant species. Prescribed burning projects give the ground surface a fertilization effect and eliminate some plant competition for weedy species giving them a niche for establishment and expansion in some areas. Ground disturbing equipment could also transport noxious weed seed to these project sites. BLM implements weed control measures in the aftermath of such ground-disturbing activities so as to minimize noxious weed establishment and spread.

Wildland fires create good seed beds and supply nutrients for weed species introduction and production. From 1981 to 2004 there have been 18 wildland fires that burned approximately 15,577 acres in this TPA. The 2000 Bucksnot Fire accounts for the large majority of this total. This fire has promoted and increased noxious weed production in this TPA. Part of fire rehabilitation activities involved weed treatments to minimize weed spread.

Mining is a land disturbing activity and the activity itself and potentially weed seed contaminated equipment that is used could promote weeds in the area.

Noxious weeds and non-native invasive species are well established and spreading in the area. Weed control activities by BLM and other entities, while often effective at reducing or minimizing weed spread and weed populations, can also lead to some weed spread. Herbicide spray equipment is driven through weed infestations and weed seeds as well as other weed vegetative parts are spread to other lands during and following treatment. The Bucksnot Wildfire area received ground treatments of about 75 acres in size following the fire. In 2003 herbicide and biological control treatments on the Bucksnot fire area were approximately 500 acres in size. Much of this treatment acreage was by aerial means coordinated with the Natural Resource Conservation Service (NRCS) and Lewis and Clark County. These weed treatments have varying success in killing undesirable plants, depending on many environmental parameters. The weeds that have been treated are primarily in the urban interface area where heavy motorized use plays a large role in the distribution of noxious weeds.

Timber sales have built in stipulations for mitigating weed production and spread. However, with ground disturbance the potential exists for weed introduction to occur on these sites. Vehicular access for tree plantings

could contribute to the spread of existing weeds on site. Since 1995 there has been 250 acres of timber salvage and 250 acres of forest planting (replanted in 2002). Herbicide treatment of existing weeds was coordinated with tree seedling planting locations and timing, so as to minimize potential exacerbation of weed spread.

Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, BLM routes available to motorized use could experience increased use from displaced users, leading to more concentrated use. Such use could cause a larger than anticipated introduction and spread of weeds. An increase in weeds would lead to an increase in needed treatment on BLM lands.

The Bureau of Reclamation (BOR) manages approximately 11,500 acres of land surrounding Canyon Ferry Reservoir. BOR actions (such as new recreation site developments) could influence travel management on adjacent BLM lands. These actions could potentially increase weed spread and production on BLM managed lands.

Portions of the TPA (North Hills, areas adjacent to Canyon Ferry and Hauser Lakes) provide winter range for mule deer and elk. Noxious weed seed are transported and spread by wildlife through their digestive system and by attaching to the animals themselves and then being released at a later time.

Livestock grazing on and off BLM lands also contributes to weed spread either through seed being spread by livestock themselves, or through vehicular uses needed to manage grazing operations.

East Helena Valley has been experiencing steady population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. These factors could lead to increased public pressure to alter travel planning for either more, or less motorized use. The increasing population in the Helena and East Helena areas will in turn lead to an increase in use of this TPA creating more opportunities for weed spread and production.

The majority of BLM managed routes for the East Helena Travel Planning area are located in or adjacent to the Ward Ranch or North Hills sub-travel planning areas. The remaining routes are located in the Spokane Hills and Townsend sub-travel planning areas. As with the Scratchgravel Hills (Helena TPA), the Ward Ranch and North Hills sub-planning areas are surrounded by residential development (there is some internal development as well). Like the Scratchgravel Hills, they have experienced steady residential development over the past 15-20 years. The Spokane Hills and Townsend sub-travel planning areas are more rural in character, but also have experienced residential/subdivision growth, near the northern and southwest portions of the Spokane

Hills and north of Townsend. This development/increase in population has led to an increase in use of the TPA by residents living adjacent to or within this area which in turn leads to an increase in weed spread and propagation.

Only 8 percent of all the travel routes in the East Helena TPA are located on BLM managed lands (under Alternative A). Lands near roads and away from roads in the TPA are infested with weeds. The travel on all roads in the TPA spreading weeds, and weeds off these roads are being spread by the weed plants themselves and other natural means. Because the majority of roads (92 percent) and lands (90 percent) in the TPA are non-BLM, activities in these areas play a stronger role than activities on BLM lands in determining the status of weed spread and weed populations in the TPA overall.

VEGETATIVE COMMUNITIES – RIPARIAN VEGETATION

Effects Common to All Alternatives

This section focuses on effects to riparian vegetation. For additional discussion of effects to water quality and stream channels, see the Water Resources and Fish sections.

Roads in riparian areas constitute ground disturbance that can eliminate or preclude presence of native riparian vegetation. This ground disturbance and loss of riparian vegetation may facilitate erosion and sedimentation of streams. Roads may also interfere with natural stream channel functions by occupying floodplains or active stream channel margins (see Water Resources section for more discussion). Noxious weeds may dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation. Noxious weed seed can be spread into riparian areas by motor vehicles via open roads. Closure of roads and trails can improve or maintain riparian condition by reducing avenues of noxious weed spread, as well as allowing for bare area re-vegetation which filters sediment in addition to stabilizing banks in some areas. Road and trail restrictions have the same effects but to a lesser degree, because some traffic will inhibit vegetation growth and recovery.

Effects of the Alternatives

As a means of comparing alternatives, **Table 4-61** depicts the miles of wheeled motorized routes that cross or are within 300 feet of streams and wet areas on BLM lands by alternative for the East Helena TPA.

Under Alternative A, 3.5 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas, and 3.6 miles of roads and trails would remain closed. The noxious weed spread, streambank, and sediment delivery effects would

continue on the open roads and trails as described above. BLM roads and trails have very minor effects on riparian conditions in this TPA because the roads and trails parallel the Missouri River/Hauser Lake shore for quite short distances or simply dead-end at or before water's edge.

Table 4-61 Miles of Roads and Trails by Proposed Management Category Within 300 feet of Streams (including intermittent streams) in the East Helena Travel Planning Area				
Miles of Wheeled Motorized Routes	ALT A	ALT B	ALT C	ALT D
Open	3.5	3.0	3.0	3.9
Restricted	0	0	0	1.9
Closed	3.6	4.1	4.1	1.2

Under Alternative B, 3.0 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas, and 4.1 miles of roads and trails would be closed. The noxious weed spread, streambank, and sediment delivery effects would continue on the open roads and trails as described in the effects common to all section. Alternative B would have slightly reduced effects to riparian areas than Alternative A.

Effects of Alternative C would be the same as those described for Alternative B.

Under Alternative D, 3.9 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas, 1.9 miles of roads and trails would have seasonal restrictions, and 1.2 miles of roads and trails would remain closed. The noxious weed spread, streambank, and sediment delivery effects would continue on the open roads and trails as described above. Restricted roads would reduce some of these effects. BLM roads and trails have very minor effects on riparian conditions in this TPA because the roads and trails parallel the Missouri River/Hauser Lake shore for quite short distances or simply dead-end at or before water's edge. Alternative D could have slightly greater effects than all other alternatives on riparian vegetation on BLM lands, but these differences in effects would be minor.

Cumulative Effects on Riparian Vegetation

Noxious weed spread, mining, roads and trails, logging operations, and livestock grazing have affected riparian resource conditions in all TPAs, including the East Helena TPA. Some of these factors continue to cause riparian area degradation primarily through direct disturbance or loss of riparian vegetation. Ground disturbance and loss of riparian vegetation facilitate erosion and sedimentation of streams. In the case of noxious weeds, they usually dominate riparian vegetation communities after some type of disturbance

(such as roads, livestock grazing, mining, etc.) has reduced native vegetation.

Anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will increase severity of runoff events which in turn will cause more sediment delivery to creeks and streams. The additional sediment is likely to affect the functioning condition of some riparian areas by causing streambeds to aggrade at unnatural rates. Streambanks may also be affected if road placements do not allow for natural stream movements or meanders.

Logging and forestry practices on public and private lands are subject to streamside management zone (SMZ) requirements designed to maintain water quality and riparian vegetation. The proposed Riparian Management Zones under Butte RMP Alternatives B and C would be wider than SMZs and activities in these areas would be designed to benefit riparian resources, thus providing more riparian protection and more targeted management of riparian vegetation in both forested and non-forested areas than under RMP Alternatives A and D. The disturbance associated with timber activities does have the potential to increase noxious weed spread which degrades riparian area function and health. On public lands noxious weed control is a standard feature of any ground disturbing activities whereas on private lands noxious weed control is variable.

Livestock grazing will continue in the area and has the potential to impact riparian resource conditions. On BLM lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain riparian vegetation health and vigor. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Riparian conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, riparian conditions would improve because of the streambank protection gained from shrubby root systems and filtering capability of native riparian sedge and rush species.

The Bucksnot Fire of 2000 burned a large portion of the Spokane Hills (approximately 15,535 acres) across multiple land ownerships. Before the vegetation could recover, subsequent storm events caused considerable sediment delivery to Canyon Ferry Reservoir from a number of ephemeral gulches.

While there are slight differences in effects to riparian vegetation between East Helena travel plan alternatives at the site scale on BLM lands as described above, in the context of cumulative effects the differences between alternatives would be negligible.

Overall, because BLM roads make up only 8 percent of all roads in the TPA (under Alternative A), and BLM lands make up 10 percent of all lands in the TPA, the contributions to riparian vegetation benefits associated with closing riparian roads on BLM lands would be minor at the scale of the entire East Helena TPA. Activities on private lands (64 percent of total acreage in TPA) would play a dominant role in determining riparian conditions at the scale of the entire TPA.

WILDLIFE

Effects of Alternative A

Under Alternative A, the East Helena TPA would have substantially more open roads (44 miles) compared to the action alternatives and would have the highest actual road density in elk winter range, 1.1 mi/mi² (Table 4-62) compared to the action alternatives. Open roads typically increase the level of recreation adjacent to roads which can result in additional disturbance and displacement of wildlife species. Roads can also encourage the public to recreate in areas that had formerly been secluded. Roads can cause direct mortality to wildlife through road kill, prevent wildlife movement, create disturbance to wildlife via vehicular use, cause the spread of noxious weeds, reduce habitat and cause habitat fragmentation on the landscape. Permanent and temporary roads could negatively impact wildlife including special status species, particularly if roads are open during critical periods such as during the winter or breeding seasons.

High open road densities under Alternative A could result in the loss of year-round habitat and migration corridors, disturbance and displacement of wildlife, road kill, and fragmentation of habitat. Wildlife, including special status species, that are especially sensitive to roads in the TPA include (but are not limited to) elk, northern goshawk and boreal toads. The detrimental effects of open road densities to wildlife under Alternative A could be minor to major and long-term. This alternative would have the greatest negative impacts to wildlife including special status species from open roads.

Under Alternative A, this TPA would have slightly fewer acres of functional winter range (6,415 acres of

area with low road density) compared to Alternative B (6,915 acres), but considerably less than Alternative C (8,899 acres) (Table 4-62). This Alternative, however, would have more functional winter range than Alternative D (5,923 acres). Alternative A would cause more disturbance and displacement of big game in winter range than all other alternatives.

Under Alternative A, approximately 1,600 acres of the East Helena TPA would be closed to snowmobile use in the Ward Ranch and McMasters areas but approximately 15,000 acres would be open for cross country use by snowmobiles. An additional 3,600 acres would be available for snowmobile use on open routes only (44 miles of open roads). Although the majority of the East Helena TPA is open to cross country snowmobile use or for use on open roads, BLM lands in this TPA do not often get favorable snow conditions for snowmobiling. Due to snow conditions, the use of snowmobiles would be limited and the effects to wintering big game and other wildlife species would be expected to be minimal the majority of the time. However, when snow conditions do become favorable, snowmobile use of the TPA could have considerable negative effects to big game and other wildlife species. The negative affects due to cross-country snowmobile use could include harassment of big game and other species during the high stress winter season. This could cause individuals to leave an area (temporarily or permanently) and/or an increase in stress that could lead to mortality.

In evaluating impacts of travel planning on elk and other big game species, it is important to consider impacts on security habitat. Elk security is the inherent protection allowing elk to remain in an area despite increases in stress or disturbance associated with the hunting season or other human activities. Security habitat includes blocks of nonlinear forested habitats greater than 250 acres in size that are at least 0.5 mile from an open road. Security habitat should also consist of larger trees (greater than 8 inches DBH) with vegetation dense enough to hide an adult elk. There would be less big game security habitat under Alternative A (1,181 acres) compared to Alternatives B (1,447 acres) and C (1,546 acres), but slightly more than Alternative D (1,048 acres) (Table 4-63).

Table 4-62
Decision Area Road Densities (mi/mi²) within Elk Winter Range
in the East Helena Travel Planning Area

	Actual Road Density	Acres of Low Road Density	Acres of Moderate Road Density	Acres of High Road Density
Alternative A	1.1	6,415	2,252	2,547
Alternative B	0.5	6,915	3,349	950
Alternative C	0.3	8,899	1,606	709
Alternative D	0.7	5,923	3,024	2,267

Low Density = 0-1 mi/mi², Moderate Density = 1-2 mi/mi², High Density = >2 mi/mi²

Table 4-63 Decision Area Acres of Big Game Security Habitat in the East Helena Travel Planning Area by Alternative				
	A	B	C	D
East Helena TPA	1,181	1,447	1,546	1,048

Core areas are areas large enough for wildlife (especially animals with large home ranges such as carnivores and big game) to forage and reproduce. Subcore areas are areas that could act as stepping stones for wildlife as they move through the region. Within all lands of the East Helena TPA there are approximately 17,292 acres identified as “core/subcore” habitat. Under this alternative, there would be 8,209 acres with low road density (less than 1 mi/mi²), 3,270 with moderate road density (1-2 mi/mi²) and 5,814 acres with high road density (greater than 2 mi/mi²) in the TPA for all land ownerships. Alternative A would provide slightly lower quality habitat in core and subcore habitat at the landscape level compared to the other alternatives.

On BLM lands, there are approximately 2,142 acres in core/subcore habitat. In core/subcore habitat under Alternative A, there would be 1,436 acres with low road density, 311 acres with moderate road density and 395 acres with high road density. Alternative A would provide slightly lower quality habitat in core and subcore habitat in the Decision Area compared to the other alternatives.

Wildlife corridors are areas of predicted movement within or between core and subcore areas. Within the East Helena TPA there are no acres identified as “high quality” wildlife movement corridors under any land ownership. There are approximately 3,374 acres identified as moderate quality corridors for all land ownerships but the majority of movement corridors are considered to be low quality (35,123 acres) due to development and road densities. In moderate quality movement corridors all alternatives would have 1,808 acres with low road density, 1,485 acres with moderate road density and 81 acres with high road density.

On BLM lands in the TPA there are no acres mapped as moderate quality movement corridors and all lands in movement corridors (6,361 acres) are considered to be low quality.

Riparian areas provide crucial habitat and critical travel corridors for wildlife including special status species. Riparian areas also provide a refuge for native plants and animals in times of stress such as drought or fire. Roads in riparian areas can prevent use of these crucial areas by wildlife, limit use, or cause loss of habitat. Under Alternative A there would be 3.5 miles of open roads in riparian areas.

Effects of Alternative B

Under Alternative B, the East Helena TPA would have substantially fewer open roads (17 miles) compared to Alternative A (44 miles). Of the 17 miles of open roads, 13.7 would be open year round and the remaining 3.3 miles would be seasonally restricted. Alternative B would have more open roads than Alternative C (12 miles) but considerably less than Alternative D (38 miles). Alternatives B and C would decrease harassment to wildlife during all seasons of use compared to Alternatives A and D. Alternatives B and C would also improve habitat and reduce fragmentation more than Alternatives A and D.

Under Alternative B, the actual road density in elk winter range in the East Helena TPA would be 0.5 mi/mi², below the maximum of 1 mi/mi² recommended by FWP in big game winter range. This is substantially lower than the road density under Alternative A (1.1 mi/mi²), higher than Alternative C (0.3 mi/mi²) and lower than Alternative D (0.7 mi/mi²) (Table 4-62).

Under Alternative B, this TPA would have more acres of functional winter range (6,915 acres) compared to Alternative A (6,416 acres), less than Alternative C (8,899 acres) but more than Alternative D (5,923 acres) (Table 4-62). Alternative B would improve the quality and quantity of winter range in the East Helena TPA compared to Alternatives A and D but would have substantially fewer beneficial effects to winter range than Alternative C.

Alternatives B and C would close more acres to cross country snowmobile use than Alternatives A (15,066 open acres) and D (14,461 open acres). Approximately 6,400 acres would be open to cross country snowmobile use under Alternative B and Alternative C would limit all snowmobile use to existing roads with no open areas for cross-country snowmobiling. Due to unfavorable snow conditions, the use of snowmobiles would most likely be limited in the TPA and the effects to wintering big game and other wildlife species would be expected to be minimal the majority of the time. However, when snow conditions do become favorable, snowmobile use under Alternative B would have fewer negative effects to big game and other wildlife species than Alternatives A and D.

The amount of big game security habitat would be slightly more under Alternative B (1,447 acres) compared to Alternatives A and D (1,181 and 1,048 acres, respectively) (Table 4-63). For all land ownerships, Alternatives B and C would have identical acres of core and subcore habitat in low (8,624 acres), moderate (3,180 acres) and high road densities (5,488 acres). Alternatives B and C would have 415 more acres in the low road density category and 326 less acres in the high road density category than Alternative A. Alternatives B and C would improve the quality of

core/subcore habitat across the landscape more than Alternative A.

Under Alternatives B and C, BLM lands in core and subcore habitat would have slightly higher acres in low road density (1,703 acres) compared to Alternative A (1,436 acres). Alternatives B and C would also have fewer acres with moderate road density (191 acres) compared to Alternative A (311 acres) and slightly fewer acres with higher road density (249 acres) compared to Alternative A (394 acres). Alternatives B and C would improve the quality of core/subcore habitat on BLM lands more than Alternative A. Alternatives B and C would protect and restore more riparian habitat than Alternative A by reducing the miles of open roads in riparian areas to 3.0 miles (from 3.5 under Alternative A). Reducing roads in riparian habitats under the Alternatives B and C would allow for more breeding, foraging and hiding habitat as well as improve movement corridors for a wide variety of species.

Effects of Alternative C

Under Alternative C, the East Helena TPA would have substantially fewer open roads (12 miles) compared to Alternative A (44 miles). Alternative C would have fewer open roads than Alternative B (17 miles) and considerably less than Alternative D (38 miles). Alternatives C and B would decrease harassment to wildlife during all seasons of use compared to Alternatives A and D. Alternatives C and B would also improve habitat and reduce fragmentation more than Alternatives A and D.

Under Alternative C, the actual road density in elk winter range in the East Helena TPA would be 0.3 mi/mi², below the 1 mi/mi² recommended by FWP in big game winter range. This is substantially lower than the road density under Alternative A (1.1 mi/mi²) and also lower than Alternative B (0.5 mi/mi²) and Alternative D (0.7 mi/mi²) (Table 4-62).

Under Alternative C, this TPA would have substantially more acres of functional winter range (8,899 acres) compared to Alternative A (6,416 acres) as well as more than Alternatives B and D (6,915 and 5,923 acres, respectively) (Table 4-62). Alternative C would improve the quality and quantity of winter range in the East Helena TPA more than all other alternatives.

Under Alternative C, snowmobile use throughout the entire East Helena TPA would be limited to open routes (12 miles). This would greatly reduce the negative effects associated with snowmobile use to big game and other wildlife species compared to all other alternatives.

The amount of big game security habitat on BLM lands would be greater under Alternative C (1,546 acres) than under any other alternative (Table 4-63). Effects associated with core and subcore habitat under Alternative C would be the same as under Alternative B.

Effects associated with riparian habitat under Alternative C would be the same as under Alternative B.

Effects of Alternative D

Under Alternative D, the East Helena TPA would have fewer open roads (38 miles) compared to Alternative A (44 miles). Of the 38 miles of open roads, 36 would be open year-round and the remaining 1.9 miles would be seasonally restricted. Alternative D would have considerably more open roads than Alternative B (17 miles) and Alternative C (12 miles). Alternatives D and A would allow more harassment to wildlife during all seasons of than Alternatives B and C. Alternatives D and A would restore less habitat and allow more fragmentation than Alternatives B and C.

Under Alternative D, the actual road density in elk winter range in the East Helena TPA would be 0.7 mi/mi², below the maximum of 1 mi/mi² recommended by FWP in big game winter range. This is lower than the road density under Alternative A (1.1 mi/mi²), higher than Alternative B (0.5 mi/mi²), and considerably higher than Alternative C (0.3 mi/mi²) (Table 4-62).

Under Alternative D, this TPA would have the fewest acres of functional winter range (5,923 acres) of any alternative. Alternative A would have 6,416 acres, Alternative B would have 6,915 acres, and Alternative C would have 8,899 acres of functional winter range (Table 4-62). Alternative D would improve the quality and quantity of winter range in the East Helena TPA compared to Alternative A but would have substantially fewer beneficial effects to winter range than Alternatives B and C.

Alternative D would close more acres (5,805 closed acres) to cross country snowmobile use than Alternative A, but would close less area than Alternatives B and C. (While no areas would actually be “closed” under Alternative C, the entire TPA would be in the “limited” category, meaning that snowmobile use would only be allowed on open roads and trails.) Approximately 14,460 acres would be open to cross country snowmobile use. Alternative D would have more acres open to cross country snowmobile use than Alternatives B and C but fewer than Alternative A. Due to snow conditions, the use of snowmobiles would most likely be limited in the TPA and the effects to wintering big game and other wildlife species would be expected to be minimal the majority of the time. However, when snow conditions do become favorable, snowmobile use under Alternative D would have greater negative effects to big game and other wildlife species than Alternatives B and, especially, C because Alternative C would limit all snowmobile use to open roads (12 miles), with no open cross country use areas.

The amount of big game security habitat under Alternative D would be 1,048 acres, the least of all alternatives (Table 4-63).

For all land ownerships in core and subcore habitat, Alternative D would have more acres (8,434 acres) with low road density than Alternative A (8,209 acres). However, Alternative D would have fewer acres with low road density than the other action alternatives. Alternatives B and C would have approximately 8,624 acres with low road density. Alternative D would also provide more acres in moderate road density (3,359 acres) than Alternative A (3,270 acres) as well as more than Alternatives B and C (3,180 acres). Alternative D would also have fewer acres in high road density (5,500 acres) compared to Alternative A (5,814 acres), but would have slightly more than Alternatives B and C (5,488 acres). Alternative D would improve the quality of core/subcore habitat across the landscape more than Alternative A but slightly less than Alternatives B and C.

Under Alternative D, BLM lands in core and subcore habitat would have slightly higher acreage with low road density (1,549 acres) compared to Alternative A (1,436 acres), but would have fewer acres with low road density compared to Alternatives B and C (1,703 acres). Alternative D would also have more acres with moderate road density than Alternatives A (311 acres), B and C (191 acres for both Alternatives B and C). Alternative D would have the same amount of acres with high road density as Alternatives B and C (249 acres) which would be fewer than those in Alternative A (394 acres). Alternative D would improve the quality of core/subcore habitat on BLM lands more than Alternative A but slightly less than Alternatives B and C.

Alternative D would protect and restore less riparian habitat than all other alternatives. Alternative D would provide the most negative effects to riparian habitats with 3.9 miles of open roads.

Cumulative Effects on Wildlife

Wildlife habitat in the East Helena TPA has been affected by roads, historic and current mining, timber harvest and salvage, weed infestations, urbanization and development, recreation, powerline corridor development, and communication sites.

The East Helena Valley has been experiencing steady population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. Primary recreation activities in the TPA include big game hunting, non-motorized uses (hiking, jogging, horseback riding, mountain biking, etc) and OHV uses (ATV, motorcycle).

Active mining claims are common in the area and there are active notices in the travel planning area as well. Increases in mineral prices could lead to increased or renewed mining activity. Mineral activity along with associate road construction and development on both private and public lands could add substantially to the negative cumulative effects to wildlife and wildlife habitats in this TPA.

In the TPA, there are 16 powerlines, three pipelines and four communication sites. In the future, communication sites on BLM lands will be restricted to existing sites but future communication sites could be built on private and other public lands in the TPA. There is the potential for future powerlines and pipelines to be built in this TPA.

There are approximately 21 right-of-ways (ROW) in the TPA and applications for ROW permits to access private property or for commercial development are likely to increase in the future. As a result, public access to BLM lands could increase. Fewer ROWs would be expected under Alternative A because more BLM roads would remain open under this alternative. Alternatives B and C would be expected to have more ROWs than Alternative D.

From 1981-2004 there have been 18 wildland fires that burned 15,577 acres in the Planning Area. Five of the fires were identified as human-caused and these fires burned the majority of the acres (15,535 acres). After the 2000 Bucksnot Fire, timber salvage occurred on approximately 250 acres of BLM lands as well as on many acres of private lands. Vegetation treatments may occur on BLM lands in the future and timber harvest is expected on private as well as other public lands in the future. Vegetation treatments would be expected to be less under Alternatives A and C than Alternatives B and D. Overall, vegetative treatments on BLM lands have had minor effects to wildlife habitat in the TPA. However, timber salvage on BLM lands has substantially reduced the distribution and amount of snag habitat for snag dependant species in the salvage units. Timber harvest along with residential development on private lands has substantially altered the landscape and caused a decline in the quality and quantity of wildlife habitat in the TPA.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the TPA. Motorized activities play a large role in the distribution of noxious weeds. The cumulative effects of the spread of noxious weeds from open roads would be greater under Alternative A than all other alternatives. Alternative A would result in more wildlife habitat being lost or degraded due to noxious weed infestations compared to the action alternatives. Alternative B would have fewer open roads than Alternatives A and D resulting in fewer infestations of noxious weeds. Alternative C would close the most roads and would have the fewest cumulative effects from loss of habitat due to noxious weeds. Open roads adjacent to BLM land would still be a conduit for the spread of noxious weeds.

Fragmentation of BLM lands in the TPA (only 10 percent of the TPA is in BLM ownership); open roads on BLM lands (about 71 miles), private lands (about 769 miles), and other public lands (about 52 miles) has reduced the quality of wildlife habitat within the TPA. Roads within the TPA can cause disturbance to wildlife along with fragmentation and loss of habitat. Roads are

associated with nearly every type of activity that has the potential to occur in the TPA including; vegetation treatments, timber salvage, mining, access to private lands (ROWs), fire suppression, powerline corridors and recreation. Open roads in the Planning Area would likely increase due to development and management of private lands. Alternative A would have the greatest negative cumulative effects to wildlife and wildlife habitat from open roads with 44 miles of open roads. Alternative B would have fewer negative cumulative effects with 17 miles of open road than Alternatives A and D (38 open miles) but more than Alternative C (12 miles).

Historic and recent timber cutting, salvage harvest, past mining activity and firewood gathering in the TPA may have reduced the amount of suitable snag habitat for cavity nesting species. Alternative A would allow continued access to the area for firewood cutting that would continue to prevent snag recruitment for snag dependant species and minimize the amount of down woody material. Alternative B would protect more snag and down woody habitat from loss due to firewood cutting than Alternatives A and D but would protect less of this habitat type than Alternative C.

Alternative A would have the greatest negative cumulative effects from open roads to wildlife and wildlife habitat of all alternatives. Under Alternative A, habitat on BLM lands would not be restored and would continue to be degraded over time. Disturbance to wildlife from open roads would continue to impact the distribution and use of the TPA by wildlife. Alternatives B and C would have greater beneficial cumulative affects to wildlife and wildlife habitats from closing roads than Alternatives A and D.

Even though the East Helena TPA is large (approximately 200,991 acres), open habitats of grasslands and shrublands along with high road densities in both the Decision and Planning Areas have prevented BLM lands from providing a large amount of suitable security habitat for big game during the hunting seasons. Under Alternatives A and D, roads would continue to reduce functional security habitat in this TPA more than Alternatives B and C.

Habitat mapped as core and subcore habitat and wildlife movement corridors would continue to have higher road densities and more negative cumulative effects under Alternative A than under the action alternatives. An increase in open roads in both the Decision and Planning Areas could result in a loss of core and subcore habitat under all alternatives but, especially, Alternatives A and D. The cumulative effects to core and subcore habitat and wildlife movement corridors would be beneficial under the action alternatives, especially Alternatives B and C.

The cumulative effects of high road densities would continue to negatively affect wildlife species during the breeding season more under Alternative A than under

the action alternatives. Alternatives B and C would have the most beneficial cumulative effects to wildlife during the breeding season compared to Alternative D and, especially, Alternative A.

FISH

For the sake of this discussion, “open” roads include roads that are open with seasonal restrictions as well as roads that are open yearlong. Roads identified as “closed” within 300 feet of streams also include roads that would be “decommissioned” in these areas by alternative. Effects to water quality described in the Water Resources section would affect fish populations and fish habitat quality. Analyses described and tabulated in the Water Resources section are referred to in the context of effects to fish in the discussion below.

Effects of Alternative A

Under Alternatives A, the East Helena TPA would have substantially more open roads (44 miles) compared to the action alternatives. Roads can have a wide range of effects on fish and fish habitat. These effects would include, but are not limited to, increased sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, conduits for noxious weeds, loss of riparian vegetation, potential decreases in stream shading that could lead to water temperature increases, and changes in local fish populations when culverts are impassable and limit fish migration.

Watershed (or hydrologic) function can be used as an indicator of relative risk or impacts to fish habitat. Generally, watersheds with high road densities often have the largest negative effects on fish and aquatic resources. To determine the effects on watershed function, a moving windows analysis was conducted on BLM lands to look at the miles of roads that would be decommissioned and removed from the landscape for each alternative. During this analysis, it was assumed that even though closing roads would improve watershed function, closed roads would remain on the landscape and could still have negative impacts to water quality and prevent or impede the restoration of riparian vegetation. Under Alternative A, there would be 5,969 acres with low road density (**Table 4-59**), 4,665 acres with moderate road density, and 9,317 acres with high road density on BLM lands in the TPA. Alternative A would have fewer acres with low road density and more acres with high road density than the action alternatives. This alternative would be expected to have greater overall negative effects to watershed function due to roads than the action alternatives.

For this discussion, road miles within 300 feet of fish bearing streams on BLM lands would be considered an indicator of direct effects to fish habitat and fish populations. Under all alternatives, there would be 0.4 miles of closed road and 0 miles of open road within 300

feet of fish bearing streams. There are no roads (open or closed) within 300 feet of streams containing special status fish species on BLM lands in the TPA.

Perennial non-fish bearing streams contribute to fish habitat indirectly by serving as conduits for watershed products (water, sediment, nutrients, contaminants, and in some cases woody material) to fish bearing streams. Under Alternative A, there would be 0.7 miles of closed road and 2.0 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. Alternative A would have 1-1.3 more miles of open roads and 1-1.3 fewer miles of closed roads within 300 feet of perennial streams than the action alternatives.

This alternative would have the greatest negative impacts to fish and aquatic resources from open roads of all the alternatives.

Effects of Alternative B

Under Alternative B, the East Helena TPA would have substantially fewer open roads (17 miles) compared to Alternative A (44 miles). Alternative B would have more open roads than Alternative C (12 miles) but less than Alternative D (38 miles). In the context of watershed function, Alternative B would have approximately 588 more acres in the low road density category and 381 fewer acres in the high road density category on BLM lands than Alternative A (**Table 4-59**). Alternative B would contribute to improved hydrologic function more than Alternative A. This analysis does consider “decommissioned” roads, but does not consider “closed” roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative B, there would be approximately 15 more miles of closed roads than under Alternative A, an additional indication that Alternative B would pose less risk to fish habitat than Alternative A.

Effects associated with roads within 300 feet of fish bearing streams on BLM lands under Alternative B would be the same as under Alternative A. Alternative B would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than Alternative A. Under Alternative B there would be 1.8 miles of closed road and 0.9 mile of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. Alternative A would leave 1.1 more miles open, and this same mileage less closed in these areas than Alternative B.

Overall, Alternative B would have fewer adverse effects to fish and aquatic habitats from increased fine sediment inputs, loss of large woody material, and loss of riparian vegetation than Alternative A.

Effects of Alternative C

Under Alternative C, the East Helena TPA would have substantially fewer open roads (12 miles) compared to Alternative A (44 miles). Alternative C would have fewer, but similar, miles of open road as Alternative B (17 miles) and considerably less than Alternative D (38 miles).

In the context of watershed function, Alternative C would have approximately 531 more acres in the low road density category and 251 fewer acres in the high road density category on BLM lands than Alternative A (**Table 4-59**). This alternative would have 57 fewer acres in the low road density category and 130 more acres in the high road density category than Alternative B. Alternative C would contribute to improved hydrologic function more than Alternative A, but to a similar degree as Alternative B. This analysis does consider “decommissioned” roads, but does not consider “closed” roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative C, there would be approximately 28 more miles of closed roads than under Alternative A, and about 13 more miles than under Alternative B.

Effects associated with roads within 300 feet of fish bearing streams on BLM lands under Alternative C would be the same as under Alternatives A and B.

Alternative C would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than all other alternatives. Under Alternative C there would be 2.0 miles of closed road and 0.7 mile of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. This is a range of 0.2-1.3 more closed miles than the other alternatives. Alternatives C and B would have fewer negative effects to fish and aquatic habitats from fine sediment, loss of large woody material and loss of riparian vegetation compared to Alternative D and, especially, Alternative A.

Effects of Alternative D

Under Alternative D, the East Helena TPA would have fewer open roads (38 miles) compared to Alternative A (44 miles). Alternative D would have considerably more open roads than Alternative B (17 miles) and Alternative C (12 miles).

With regard to hydrologic function, Alternative D is very similar to Alternative C. Alternative D would have approximately 533 more acres in the low road density category and 221 fewer acres in the high road density category on BLM lands than Alternative A (**Table 4-59**). This alternative would have 55 fewer acres in the low

road density category and 160 more acres in the high road density category than Alternative B. Alternative D would contribute to improved hydrologic function more than Alternative A. Under Alternative D, there would be approximately three more miles of closed roads than under Alternative A, about 12 miles less than under Alternative B, and about 25 miles less than under Alternative C. Since Alternative D would have fewer closed roads than Alternatives B and C, overall watershed function would be expected to be less under this alternative.

Effects associated with roads within 300 feet of fish bearing streams on BLM lands under Alternative D would be the same as under the other alternatives.

Alternative D would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than Alternative A. This alternative would have similar effects as Alternative B in this respect as it would leave 0.1 more mile of road open in these areas. Alternative D would have more road-related adverse effects to fish and aquatic habitats than Alternatives B and C, but would improve conditions over the current conditions in Alternative A.

CUMULATIVE EFFECTS ON FISH

The East Helena TPA supports a variety of native and introduced fish species. One of the major human influences to fish in the TPA has been the introduction of non-native trout species including rainbow trout, brook trout, brown trout throughout the TPA and also Yellowstone cutthroat trout into Beaver Creek. Rainbow trout have hybridized with the native westslope cutthroat trout in many streams. Brook trout and brown trout have displaced the native cutthroats in other streams, especially those altered by sedimentation and increased water temperatures brought on by human activities. Non-native fish stocking has eliminated native westslope cutthroat trout from much of its historic habitat in this TPA.

Damming of the Missouri River to create Holter Lake, Hauser Lake, and Canyon Ferry Reservoir dramatically altered aquatic habitat. Approximately 40 miles of the Missouri River were converted into lake habitat. These alterations, along with long-term stocking of non-native fish and other human-caused impacts have combined to replace native westslope cutthroat trout populations with non-native sport fisheries such as walleye, yellow perch, rainbow trout, and brown trout. These reservoirs now have multiple water quality impairments (see Water Resources section).

The East Helena Valley has been experiencing steady population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. Primary recreation activities in the TPA include big game hunting, non-motorized uses (hiking,

jogging, horseback riding, mountain biking, etc) and OHV uses (ATV, motorcycle).

Land development and urbanization has caused substantial impacts to watershed function in this TPA.

Agricultural activities from farming and ranching also contribute increases in nutrients, sedimentation, and loss of aquatic habitats. Many streams in the TPA have been impacted by historic and ongoing livestock grazing that breaks down streambanks, widens channels, removes vegetative cover, and causes an increase in fine sediment and nutrients.

Active mining claims are common in the area and there are active notices in the TPA, as well. Increases in mineral prices could lead to increased or renewed mining activity. Many watersheds and aquatic habitats in the TPA have been degraded by historic mining activities.

Fires, floods, and drought have historically affected fish habitat in the TPA. These disturbances can cause a pulse of sediment or may temporarily reduce the quality of fish habitat in some watersheds while leaving other streams largely unaffected. Natural disturbances are typically followed by periods of stability, during which fish habitats and populations recover. Population recovery in disturbed streams may be facilitated by fish immigration from nearby drainages less affected by the catastrophic event. From 1981-2004 there have been 18 wildland fires that burned 15,577 acres. Five of the fires were identified as human-caused and these fires burned the majority of the acres (15,535). The largest fire to occur from 1981-present was the 2000 Bucksnot Fire.

Timber harvest can alter the recruitment of large woody debris, reduce canopy closures and resulted in an increase in fine sediment to streams. Timber harvest along with associated roads can contribute substantially to the overall cumulative effects in forested watersheds. After the 2000 Bucksnot Fire, timber salvage occurred on approximately 250 acres of BLM lands as well as on private lands. Additional vegetation restoration may occur on BLM lands in the future. Vegetative treatments would be expected to be less under Alternatives A and C than Alternatives B and D. Overall, vegetative treatments on BLM lands have had minor effects to aquatic habitat in the TPA.

Roads are another major contributor of sediment to streams and a major problem with regards to cumulative watershed effects. Roads and trails can have localized effects on nearby stream segments or at stream crossing sites, especially fords. In some cases, effects are more extensive and may impair fish habitat for longer reaches of streams. Cumulatively, roads degrade aquatic habitat due to sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, loss of riparian vegetation, loss of large woody material and roads can cause changes in local fish populations when culverts

are impassable and limit fish migration. Alternative A would have more negative cumulative effects to watersheds and individual streams due to roads than the action alternatives. Alternative B would have fewer negative cumulative effects than Alternatives A and D but more than Alternative C. Alternative B would improve overall watershed function as well as improve habitat in individual streams more than Alternatives A and D, and to a similar degree as Alternative C.

SPECIAL STATUS PLANTS

Effects Common to All Alternatives

Ground-disturbing activities from road construction and maintenance, as well as road use by vehicles can affect special status plant populations and habitat. These activities can reduce sensitive plant species through disturbance to individual populations, increasing competition from invasive species, and reducing habitat connectivity. Closure of roads and trails can improve or maintain sensitive plant populations or habitat by reducing avenues of noxious weed spread, maintaining habitat connectivity, and improving pollinator habitat. Road and trail restrictions have the same effects but to a lesser degree.

Effects of the Alternatives

Under Alternative A, 36.6 miles of roads and trails would remain open, 7.7 miles of roads and trails would be open with seasonal restrictions, and 26.4 miles of roads and trails would be closed. On the open roads, effects would continue as described in the Effects Common to All Alternatives section. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators.

Under Alternative B, 13.7 miles of roads and trails would remain open, 3.3 miles of roads and trails would be open with seasonal restrictions, 41.9 miles of roads and trails would be closed, and 4.7 miles would be decommissioned. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. By providing more closed and decommissioned roads, Alternative B would benefit and reduce risk to special status plants more than Alternative A.

Under Alternative C, 12 miles of roads and trails would remain open, 54.6 miles of roads and trails would be closed, and 4.0 miles would be decommissioned. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative C would benefit and reduce risk to special status plants the most of all alternatives because

it would eliminate disturbance, vehicular use, and spread of noxious weeds on the most road miles.

Under Alternative D, 36 miles of roads and trails would remain open, 1.9 miles of roads and trails would be open with seasonal restrictions, 29.7 miles of roads and trails would be closed, and 3.1 miles would be decommissioned. On the open roads, effects would continue as described in the Effects Common to All Alternatives section. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative D would benefit and reduce risk to special status plants compared to Alternative A, but would pose more risk compared to Alternatives B and C.

Cumulative Effects on Special Status Plants

Under all alternatives there are a number of past, present, and reasonably foreseeable future actions that affect special status plant populations.

Livestock grazing will continue in the area and has the potential to impact sensitive plant populations and habitat. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain sensitive species populations and habitat. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, sensitive plants would benefit from the reduced competition. Use of herbicides for noxious weed control could cause mortality to special status plants if individual plants are inadvertently sprayed.

Recent and anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will reduce sensitive plant species habitat and in some cases individual populations. Additionally, subdivisions have the potential to disrupt the connectivity of plant habitat and populations as well as disturbing or eliminating pollinators needed by sensitive species. Some sensitive species that require soil disturbance may benefit.

Timber sale activity disturbance can destroy or degrade sensitive plant habitat. On public lands, projects would be designed to avoid, mitigate, or enhance sensitive plant habitats. The disturbance associated with timber harvest activities does have the potential to increase noxious weed spread which degrades sensitive species habitat and individual plant populations.

The Bucksnot fire of 2000 burned a large portion of the Spokane Hills. The burn encouraged a lot of noxious weed spread, particularly Dalmatian toadflax on south facing slopes, which degraded sensitive plant habitat. Conifer encroachment into grassland habitats was reversed by the fire thus restoring grassland habitat that could benefit some special status plant species.

At the scale of the entire East Helena TPA (all land ownerships), the BLM travel plan alternatives would have slightly variable contributions to cumulative effects on special status plants. Under Alternative A approximately 3 percent of all roads in the TPA would be closed. Under Alternative B adverse effects on special status plants would be slightly reduced compared to Alternative A because 5.2 percent of all roads in the TPA would be closed or decommissioned. Alternative C would provide the most benefits of all alternatives as 6.6 percent of all roads in the TPA would be closed or decommissioned. Alternative D would provide slightly more benefits than Alternative A but slightly fewer benefits than either Alternatives B or C as 3.7 percent of all roads in the TPA would be closed or decommissioned. Because BLM lands make up only 10 percent of the area in the TPA, activities on non-BLM lands would play a greater role in determining the status of special status plants.

WILDLAND FIRE MANAGEMENT

Travel planning alternatives were analyzed to determine whether they could result in impact on wildland fire management, causing change to any of the following indicators:

- Fire regime condition class (FRCC)
- Firefighter and public safety
- Reducing threat to Wildland Urban Interface (WUI)

Effects Common to All Alternatives

Public road access during the fire season provides opportunities for human-caused fires either due to catalytic converters on vehicles igniting dry vegetation, or due to some types of human activities. Roads that are closed to public access reduce the risk of human-caused fire starts in those areas.

Decommissioned roads and roads that are closed and not regularly maintained for navigability reduce access for fire suppression. Closed roads may become impassible due to vegetation regrowth, downfall of trees, or severe erosion. Some roads may be closed with earthen berms or fallen trees and would need to be physically manipulated to make them useable for vehicles again. These roads would extend firefighting response time and have negative impacts on efforts to reduce wildland fire threat to WUI areas and firefighter and public safety. In an emergency fire suppression situation, any navigable closed roads needed for fire suppression would be used

immediately. Non-navigable closed roads could also be used if deemed to be needed for fire suppression, after needed improvements are made to make those roads useable. Planning and implementation of fuels reduction treatments could occur in association with closed roads if variances for temporary road use were to be allowed. Variances would be subject to internal BLM review.

In the context of fuels reduction projects, availability of open roads is important to facilitating fuels project location as well as increasing project feasibility and decreasing costs. Open roads also facilitate spread of noxious weeds by transporting weed seed on vehicles and their tires. Presence of large noxious weed populations could delay or cause fuels projects to be cost-prohibitive due to the fact that the weeds may have to be treated before and/or after the fuels treatment. Also, some applications of fuel treatments (e.g., prescribed fire) may promote the spread of some weeds. The presence of weeds and non-native species are indicators that FRCC has departed from historical conditions.

Noxious weeds and non-native invasive species are well established and spreading in the East Helena TPA.

Effects of Alternative A

Alternative A provides more motorized opportunities than non-motorized opportunities. Under Alternative A, a total of 44.3 miles of wheeled motorized routes would continue to be open (36.6 open yearlong, 7.7 miles seasonally restricted), while 26.4 miles (37 percent of total) would continue to be closed. Alternative A would allow for the greatest flexibility between alternatives for access for suppression purposes. Fuels project feasibility would be highest under this alternative. However, public access during the fire season would be the greatest under this alternative and would provide the most opportunities for human-caused fire starts.

The distribution of noxious weeds could be the greatest under alternative A with the most open roads and noxious weeds already well established. This would contribute to reduced feasibility of fuels reduction projects more than under any other alternative.

Effects of Alternative B

Alternative B provides for separate use areas for wheeled motorized and non-motorized recreational opportunities. Under Alternative B, 13.7 miles of wheeled motorized routes would be available yearlong and 3.3 miles would be seasonally restricted. Alternative B would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A due to the fact that motorized access would be limited to 17 miles of road. Of the 46.3 miles of closed roads, 4.7 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-caused fires associated with motorized use would be limited compared to

Alternative A, due to a 28 percent decrease in miles of road open to motorized public travel compared to Alternative A.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Motorized activities play a large role in the distribution of noxious weeds. Because more roads would be closed under this alternative, Alternative B should help reduce the spread of noxious weeds and may make fuels treatments more feasible than under Alternative A, reducing FRCC departure.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized access in the East Helena travel planning area. Under Alternative C, 12.0 miles of wheeled motorized routes would be available yearlong.

Alternative C would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down compared to both Alternatives A and B, due to the fact that access would be limited to 12 miles of road. Of the 58.6 miles of closed roads, 4.0 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-caused fires associated with motorized use would be the lowest of all alternatives, due to a 45 percent decrease in open road miles compared to Alternative A. However, this degree of reduced motorized access may promote more non-motorized users to a concentrated area, increasing the odds for a human-caused fire to occur by another ignition source.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more road miles would be closed than under any other alternative, Alternative C should help reduce the spread of noxious weeds more than under any other alternative, and may make fuels treatments more feasible, reducing FRCC departure.

Effects of Alternative D

Under Alternative D, 36 miles of open routes would be available yearlong for wheeled motorized use and 1.9 miles would be seasonally restricted. Of the 32.8 miles of closed roads, 3.1 miles would be decommissioned and would likely be unusable for fire suppression. Alternative D would be more flexible than Alternatives B and C, but it would limit flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A. The risk of human-caused fires associated with motorized vehicle use would be reduced compared to Alternative A, but would be greater than under Alternatives B and C, due to a 9 percent decrease in open roads compared to Alternative A.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because an

intermediate number of road miles would be closed under this alternative, Alternative D should help reduce the spread of noxious weeds and may make fuels treatments more feasible than under Alternative A, but would increase weed spread and potentially make projects less feasible than under Alternatives B or C.

Cumulative Effects on Wildland Fire Management

Effects on wildland fire management associated with any of the BLM travel plan alternatives would be overshadowed by reasonably foreseeable uncharacteristic fire, continued fire suppression made necessary by WUI and intermingled landownership, and large-scale forest insect infestations and disease outbreaks that would continue for the planning period. BLM lands make up about 10 percent of all lands while BLM roads make up about 8 percent of all roads in the TPA.

Revision of the Helena National Forest Plan could result in more or less treatment of adjacent areas. Because no decision has been made, the effects are not known. Wildland fire management, particularly where wildland fire use (management of naturally ignited wildland fires to achieve resource objectives) may occur on USFS lands, will be determined in the plan decision. BLM would need to coordinate with USFS on all wildland fire use actions and events. Wildland fire use on USFS lands could affect FRCC on BLM lands. USFS lands make up 6.6 percent of all lands in the TPA.

Additionally, decisions to increase the level of wildland fire use, prescribed fire, or open burning by the public could impact the BLM's ability to use wildland fire and prescribed fire due to air quality concerns and requirements. This could postpone or eliminate BLM fuel reductions or treatments to improve FRCC.

Access is a critical component of wildland fire suppression. In some cases, access to public lands is being reduced by adjacent landowners gating or closing roads, which could hamper wildland fire suppression efforts and pose a risk to public and firefighter safety. Reducing access would also increase the potential for larger fires to occur due to an increase in time needed to access a fire and control it. Time needed to move in crews would be extended, and the ability to effectively apply and place resources (e.g., engines, water tenders, etc.) would be limited.

Effects on wildland fire management, including FRCC and firefighter and public safety due to management accomplished by other landowners may affect wildland fire management on public lands. When activity fuels (such as logging slash) are not treated adequately, fuel hazard could increase on adjacent lands which could affect fire intensity and severity on public lands. When adjacent owners treat fuels or implement fire mitigation plans in the WUI, fires are easier to suppress and

firefighter safety is increased. In this TPA, activities on private lands (64 percent of all lands in TPA) would have more influence on future fire characteristics in the area overall than activities on BLM lands (10 percent of all lands in TPA).

Human population increases and subsequent residential development are likely to expand the WUI and could alter forest management, taking the emphasis off restoring historic composition and structure and focusing more on fuel reduction.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Effects Common to All Alternatives

Alternative-specific risks or impacts to cultural and paleontological resources are difficult to discern due to a lack of extensive site-specific knowledge about the presence of these resources in a given TPA. By designating open routes, limiting open-country travel, and closing some routes, inadvertent discovery of cultural and paleontological resources and vandalism to them is reduced. Higher road densities in a given area would allow greater access to more land on the average, but that does not imply greater amounts of vandalism, since the vehicles would remain on designated routes.

VISUAL RESOURCES

Effects Common to All Alternatives

Roads (temporary or permanent) may affect visual quality. Roads that remain open for public use may impact visual qualities where noticeable. The quantity of open roads would also influence sensitivity levels since with more open roads, more areas would generally be viewed by more members of the public. Closing or decommissioning roads would generally reduce effects to visual resources and reduce sensitivity levels because fewer members of the public would generally be accessing and viewing areas with closed roads.

Effects of the Alternatives

Under Alternative A, 44.3 road miles would be open (including open with seasonal restrictions), 26.4 miles would be closed. Alternative A would have the greatest impact on visual resources of all alternatives.

Under Alternative B there would be 17 miles of open road (including roads open with seasonal restrictions), 41.9 miles of closed road, and 4.7 miles of decommissioned road. Additional road closures and decommissioning under this alternative would reduce effects on visual resources compared to Alternative A.

Under Alternative C there would be 12 miles of open road, 54.6 miles of closed road, and 4 miles of decommissioned road. Alternative C would have fewer

adverse effects and would improve visual resources the most of all alternatives.

Under Alternative D there would be 38.6 miles of open road (including roads open with seasonal restrictions), 29.7 miles of closed road, and 3.1 miles of decommissioned road. Effects to visual resources would be similar but slightly less than under Alternative A, the greater than under Alternatives B and C.

Cumulative Effects on Visual Resources

Under all alternatives, most activities on BLM lands would generally not adversely affect visual resources to unacceptable degrees because discretionary activities on BLM lands would be required to meet Visual Resource Management objectives within individual project areas.

Activities on non-BLM lands, particularly activities near BLM lands associated with residential development, urbanization, or vegetation management, could have adverse cumulative effects on visual resources on BLM lands because BLM VRM objectives would obviously not apply to non-BLM activities.

LIVESTOCK GRAZING

Effects Common to All Alternatives

Roads and trails can potentially affect livestock grazing management. Roads and trails often act as avenues of noxious weed spread. Noxious and invasive weeds can reduce the quantity and quality of forage for livestock. Users of roads and trails can cause management problems for livestock permittees when they leave gates open at fences, vandalize range improvements, or harass livestock either purposely or unintentionally.

Closure of roads and trails can improve or maintain the forage base by reducing vectors of noxious weed spread. Additionally, road and trail closures can reduce management conflicts. On the other hand, closures may increase permittees' time requirements if and when work has to be conducted with horses or afoot. Permittees could minimize effects of closed roads on grazing management time by seeking variances from the BLM for temporary use of specific closed roads.

Effects of the Alternatives

Under Alternative A, 44.3 miles of roads and trails would remain open during grazing season, and 26.4 miles of roads and trails would be closed. Effects would continue as described in the Effects Common to All Alternatives section. All action alternatives would close or decommission more roads and trails than Alternative A. As more roads and trails are closed, noxious and invasive weed spread along with multiple user conflicts would be reduced. On the other hand, permittee management time may increase. Consequently, more effects as described under the Effects Common to All Alternatives section would occur under Alternative C

(12 miles open, 58.6 miles closed or decommissioned) than under any other alternative. Alternative B (16 miles open during grazing season, 46.6 miles closed or decommissioned) would produce fewer effects than Alternative C, but more than Alternative A or Alternative D (38 miles open during grazing season, 32.8 miles closed or decommissioned). Alternative D would have fewer effects than Alternatives B or C, but more than Alternative A.

Cumulative Effects on Livestock Grazing

A number of past, present, and reasonably foreseeable future actions affect livestock grazing at the scale of the entire East Helena TPA. Livestock grazing will continue in the area and has the potential to impact forage quality and quantity. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain forage quality and quantity. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, forage conditions would benefit.

The Bucksnot fire of 2000 burned a large portion of the Spokane Hills. The burn encouraged a lot of noxious weed spread, particularly Dalmatian toadflax on south facing slopes. On the other hand, many grasslands were improved with the reduction of conifers; forage production for livestock increased substantially.

Because BLM lands make up only 11 percent of all lands in the East Helena TPA, all of the BLM travel plan alternatives would have a minimal contribution to cumulative effects on livestock grazing at the scale of the entire TPA.

MINERALS

Effects Common to All Alternatives

Road closures and decommissioning could affect access to locatable minerals in areas of moderate or high mineral potential. Operators would be required to seek travel variances from the BLM to use motor vehicles to conduct mineral exploration on closed roads, or to conduct exploration on seasonally restricted routes during the season of closure. Decommissioned roads could not be used for motorized exploration. Travel management provisions that require a permit or variance could result in reducing access to mining claims or interfere with the ability to conduct exploration work for some operators. Historic knowledge of mineralized areas associated with "closed" roads may be lost after long periods of time if no exploration occurs there. Additional costs and time could be required for exploration and development of mining projects associated with closed

or decommissioned roads. Impacts of road closures or decommissioning in areas with low mineral potential would not be substantial to mineral development.

Effects of the Alternatives

Effects of the alternatives for the East Helena TPA on access to mineralized areas are summarized in **Table 4-64**. Alternative A would close 18 percent of the roads in high mineral potential areas.

Table 4-64 Analysis of Access to Mineral Potential Areas East Helena TPA				
Mineral Potential	Open Miles (%)	Seasonally Restricted Miles (%)	Closed Miles (%)	Decom Miles (%)
Alternative A				
High	8.8 (12%)	0.0 (0%)	12.4 (18%)	0.0 (0%)
Moderate	1.3 (2%)	0.1 (0%)	0.0 (0%)	0.0 (0%)
Low	26.5 (37%)	7.6 (11%)	14.0 (20%)	0.0 (0%)
Total Miles = 70.7				
Alternative B				
High	6.0 (8%)	4.8 (7%)	10.5 (15%)	0.0 (0%)
Moderate	0.5 (1%)	0.8 (1%)	0.1 (0%)	0.0 (0%)
Low to none	7.2 (10%)	4.8 (7%)	31.3 (44%)	4.7 (7%)
Total Miles = 70.7				
Alternative C				
High	5.4 (8%)	0.0 (0%)	15.8 (22%)	0.0 (0%)
Moderate	0.7 (1%)	0.0 (0%)	0.8 (1%)	0.0 (0%)
Low to none	6.0 (8%)	0.0 (0%)	38.0 (54%)	4.0 (6%)
Total Miles = 70.7				
Alternative D				
High	12.9 (18%)	1.9 (3%)	6.5 (9%)	0.0 (0%)
Moderate	1.4 (2%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Low to none	21.7 (31%)	0.0 (0%)	23.2 (33%)	3.1 (4%)
Total Miles = 70.7				
Mineral Potential areas have been delineated by the Montana Bureau of Mines and Geology (MBMG)				

Alternative B for the East Helena area travel plan would seasonally restrict 7 percent and would close 15 percent of the roads in high mineral potential areas (Table 4-64). Alternative B would have more impacts than Alternative A.

Alternative C would close 22 percent of the roads in areas with high mineral potential and 1 percent of those with moderate mineral potential (Table 4-64). Alternative C would have the most potential to affect access to mineralized areas of all the alternatives.

Alternative D would seasonally restrict 3 percent, and close 9 percent of the roads in areas with high mineral potential (Table 4-64). Alternative D would have more impacts than Alternative A, but less than Alternatives B and C.

Cumulative Effects on Access to Mineralized Areas

No other past, present, or reasonably foreseeable future action in the East Helena TPA would adversely affect mineral availability or access.

RECREATION

Effects of travel plan alternatives on Recreation in the East Helena TPA are described qualitatively below.

Effects of Alternative A

Alternative A would provide more motorized opportunities than non-motorized opportunities. Under Alternative A, a total of 44.3 miles of wheeled motorized routes would be open (36.6 miles open yearlong, 7.7 miles seasonally restricted). With the exception of the Ward Ranch, McMasters, and Spokane Hills temporary area closures, the remainder of the travel planning area would remain available to cross-country area snowmobile use, as well as travel on all existing routes during the season of use (12/2-5/15), conditions permitting.

Effects of Alternative B

Alternative B would provide for separate use areas for wheeled motorized and non-motorized recreational opportunities. Under Alternative B, 13.7 miles of wheeled motorized routes would be available yearlong, and 3.3 miles would be seasonally restricted. Cross-country snowmobile travel would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), except for the North Hills, Dana's Bar, and the area located to the west of Prickly Pear Creek. The remainder of the travel planning area (McMasters Hills, Ward Ranch, and Spokane Hills) would be closed to all cross-country snowmobile use, including travel on existing roads and trails. Conflicts between non-motorized users (cross-country skiers, snowshoers) and snowmobilers would be expected to continue or increase in areas with shared use.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized access in the East Helena travel planning area of all alternatives. Under Alternative C, 12.0 miles of wheeled motorized routes would be available yearlong. No cross-country snowmobile use would be allowed; use would be restricted to designated routes only during the season of use (12/2-5/15), snow conditions permitting. This would likely reduce conflicts with non-motorized winter users (cross-country skiing, snowshoeing).

Effects of Alternative D

Alternative D would provide the highest level of motorized access and the fewest non-motorized opportunities of the action alternatives. Under Alternative D, 36.0 miles of wheeled motorized routes would be available yearlong, and 1.9 miles would be seasonally restricted. Snowmobile management under would be as follows: cross-country travel would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), for the North Hills, Dana's Bar, and the area located to the west of Prickly Pear Creek. The Ward Ranch and the Big Bend areas would be closed to all cross-country snowmobile use as well as travel on designated routes.

Cumulative Effects on Recreation

Under Alternative A, motorized travel opportunities would be the greatest under this alternative given the miles of roads available to wheeled vehicles and the acres available to snowmobile uses. Big game hunting opportunities within the North Hills, McMaster Hills, Ward Ranch and Spokane Hills would continue. Existing travel restrictions in these areas would encourage big game retention, quality walk-in hunting and game retrieval challenges as motorized vehicle use would be limited. During the non-hunting season conflicts between non-motorized and motorized users would remain relatively high within the North Hills. Public access and management of developed recreation sites along the Missouri River would continue to provide for a wide spectrum of water based opportunities and visitor trends are expected to increase. The newly constructed 30-unit campground and day-use facility at White Sandy on lower Hauser Lake scheduled to be open 5/25/07 will help meet growing visitation needs and better distribute use on the 15-mile lake.

Under Alternative B, motorized travel opportunities would be decreased while non-motorized opportunities would be enhanced overall. Big game hunting opportunities within the North Hills, McMaster Hills, Ward Ranch, and Spokane Hills would continue. Additional travel restrictions in these areas would promote more big game retention on public lands and better walk-in hunting experiences. Opportunities for individuals who are physically challenged would be

improved in the Spokane Hills. In addition, game retrieval would be enhanced since motorized routes would be provided in the Spokane Hills. More emphasis would be placed on maintaining undeveloped open space areas for dispersed recreation. Given the increasing development pressures on adjoining private lands throughout the Missouri River corridor, it is anticipated that these open areas will be more important with time. Use levels within the North Hills are expected to increase while conflicts between non-motorized and motorized users should be reduced. Although available travel routes and motorized riding opportunities would be limited, access to higher elevation lands and quality walk-in areas would be retained to help disperse users and ensure natural settings. Cumulative impacts on developed recreation sites and water based activities would be similar to Alternative A.

Alternative C would impose the greatest impacts on motorized travel opportunities while opportunities for non-motorized experiences would be the most benefited. Recreation Opportunity Spectrum management and big game hunting opportunities within the TPA would be similar to Alternative B with the exception that no motorized routes would be provided for big game retrieval or handicapped hunting in the Spokane Hills. Cumulative impacts on developed recreation sites and water based activities would be similar to Alternative A.

Under Alternative D, cumulative effects of the travel management actions coupled with all other existing and reasonably foreseeable actions would be similar to Alternative A.

TRAVEL MANAGEMENT AND ACCESS

Effects of Alternative A

Under Alternative A in the East Helena TPA, there would be 36.6 miles of BLM road open yearlong, 7.7 miles open with seasonal restrictions, and 26.4 miles of closed roads (**Table 4-65**). Alternative A would provide for the greatest degree of motorized opportunities, and the lowest degree of non-motorized opportunities of all alternatives. With the exception of the Ward Ranch, McMasters, and Spokane Hills temporary area closures, the remainder of the TPA would remain available to cross-country area snowmobile use, as well as travel on all existing routes during the season of use (12/2-5/15), conditions permitting.

The extent of management activities and costs under Alternative A would be mixed. Less personnel time would be required to monitor travel compliance than under any alternative. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards) than under any other alternative. Estimated costs for road/trail maintenance would be highest of all alternatives.

The need for BLM and members of the public to obtain travel variances for temporary specific uses of specific

Table 4-65				
East Helena TPA Route Management Summary				
Proposed Management	Total Miles			
	Alt A	Alt B	Alt C	Alt D
Wheeled motorized routes				
Open Yearlong	36.6	13.7	12.0	36.0
Seasonally Restricted	7.7	3.3	0	1.9
Closed	26.4	41.9	54.6	29.7
Decommissioned	0	4.7	4.0	3.1
Non-motorized trails ¹	26.4	47.1	59.1	32.6
¹ Non-motorized trails include all existing trails, closed roads, and decommissioned roads.				

closed roads would be minimal under this alternative, given the availability of motorized access.

Effects of Alternative B

Alternative B in the East Helena TPA would help provide separate use areas for wheeled motorized and non-motorized recreational opportunities. Motorized access in the North Hills area would decrease compared to Alternative A (**Table 4-65**). Other than route 516, the primary access route to a non-motorized trailhead in the North Hills, the remaining road network would be seasonally restricted to prevent soil erosion. The result of these management actions would increase opportunities for non-motorized users and enhance their enjoyment through the increase in trails exclusively for hiking, mountain biking, horseback riding, and other non-motorized activities.

Under Alternative B, cross-country snowmobile travel would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), except for the North Hills, Dana's Bar, and the area located to the west of Prickly Pear Creek. The remaining areas (McMasters Hills, Ward Ranch, and Spokane Hills) would be closed to all cross-country snowmobile use, including travel on existing roads and trails. Conflicts between non-motorized users (cross-country skiers, snowshoers) and snowmobilers would be expected to continue or increase in areas with shared use.

Enhanced motorized access would be available for the Ward Ranch area, where public access would be extended from its current closure point to the ranch complex once the ranch residence is vacated.

Motorized access for the McMasters area would be reduced compared to Alternative A.

One additional non-motorized trailhead would be established in the Big Bend area, increasing opportunities for hiking, horseback riding, and other non-motorized pursuits.

Opportunities for disabled hunters would increase compared to the other alternatives. Motorized access to the southern portion of the Spokane Hills would be allowed for hunters with a disability for a two-week

period each year. These same motorized routes would be available during the general hunting season for game retrieval opportunities.

Route closures across 60 percent of the area would reduce unauthorized travel (illegal off-road use by ATVs and motorcycles) and illegal activities (underage alcohol use, drug use, vandalism, dumping) in the North Hills and elsewhere.

The reduction in motorized use under Alternative B would enhance safety among users of the East Helena TPA, compared to Alternatives A and D, and to a similar extent as under Alternative C.

Trailhead development costs would be greater under Alternative B than under Alternative A due to the development of new non-motorized trailheads in the North Hills and Big Bend areas.

The extent of management activities and costs under Alternative B would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards) than under Alternative A. However, more effort would be required for public education and compliance than under Alternative A. Estimated costs for road/trail maintenance would be less than under Alternative A.

The need for BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be greater under Alternative B than under Alternative A.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized access in the East Helena TPA of all alternatives. The area would feature only 12.0 miles of motorized access under Alternative C, which is about 73 percent less than under Alternative A, and 29 percent less than Alternative B (**Table 4-65**).

Closure and decommissioning of routes in the East Helena TPA would result in an increase in non-motorized opportunities with a corresponding decrease in motorized opportunities. Alternative C would provide 55 percent more miles of non-motorized trails than Alternative A, and 20 percent more than Alternative B.

No cross-country snowmobile use would be allowed. Use would be restricted to designated routes only during the season of use (12/2-5/15), snow conditions permitting. This would likely reduce conflicts between snowmobilers and non-motorized winter users (cross-country skiing, snowshoeing).

Having routes 0516A and 0516 provide the only motorized access to the North Hills would result in decreased motorized opportunities but increased opportunities for non-motorized recreation (and low levels of conflict).

Keeping route 050133A closed at its current location (regardless if the Ward Ranch is vacated in the future) would result in fewer motorized opportunities in the Ward Ranch area than under Alternative B. However, non-motorized opportunities would increase under Alternative C because visitors could park at the current motorized closure area, and walk approximately 0.25 mile to the ranch complex.

Motorized access to the McMasters area would be the same under Alternatives B and C, representing a reduction in motorized use to the area compared to Alternative A.

Allowing motorized access to only the primary residential access routes in the Prickly Pear Creek area (south of Black Sandy) and no motorized access in the Big Bend area would result in an increase in non-motorized recreational opportunities in both these areas. Motorized access for these areas would be more restricted under Alternative C than under all other alternatives.

Restricting motorized access in the Spokane Hills area to a non-motorized trailhead at the end of route EH07A would result in an increase in non-motorized opportunities in this area. Alternative C would be more restrictive than the other alternatives and would result in a decrease in motorized opportunities in this area.

Not developing a non-motorized trailhead in the Big Bend area would result in a decrease in travel management costs under Alternative C compared to Alternative B.

The extent of management activities (and costs) under Alternative C would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards) than under any other alternative. However, more effort would be required for public education and compliance than under any other alternative. Estimated costs for road/trail maintenance would be the lowest of the alternatives.

The need for BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be greater under Alternative C than under any other alternative.

Effects of Alternative D

Alternative D would provide the highest level of motorized access in the East Helena TPA of the action alternatives, featuring approximately 33 percent more open routes than under Alternatives B and C (**Table 4-65**). All of the designated routes would be available for motorized use in the North Hills compared to the seasonally restricted closures under Alternatives A, B, and C. Snowmobile management under Alternative D would be as follows: cross-country travel would be allowed, as well as travel on all existing routes during the season of use (12/2-5/15), for the North Hills, Dana's Bar, and the area located to the west of Prickly Pear

Creek. The Ward Ranch and the Big Bend areas would be closed to all cross-country snowmobile use as well as travel on designated routes. Opportunities for snowmobile use would be less than under Alternative A, but greater than under Alternatives B and C.

Alternative D would not minimize or reduce conflicts between motorized and non-motorized recreation in the North Hills, where conflicts are most evident within the East Helena TPA, because dispersed recreational opportunities would not be provided. User conflict would be greater under Alternatives A and D than Alternatives B and C.

Increasing motorized access in the McMasters area by adding a new loop route would result in increased opportunities for motorized vehicle users. Reducing the number of non-motorized trailheads would result in a decrease in non-motorized opportunities in this area.

Increasing motorized access west of Prickly Pear Creek, in the Big Bend area, the Spokane Hills, and in the Townsend area would result in increased motorized opportunities. Conflict between motorized and non-motorized users would increase as well.

Relocating the trailhead in the Spokane Hills would result in increased travel management costs compared to Alternative A.

The extent of management activities and costs under Alternative D would be mixed. Less personnel time would be required to monitor travel compliance than under Alternatives B and C, but slightly more would be needed than under Alternative A. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards) than under Alternatives B and C, but less would be needed than under Alternative A. Estimated costs for road/trail maintenance would be higher than under the other action alternatives.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be greater under Alternative D than under Alternative A, but less than under Alternatives B and C.

Cumulative Effects on Travel Management and Access

Under all alternatives, there are a number of past, present, and reasonably foreseeable future BLM and non-BLM actions and activities affecting travel management and access in the East Helena TPA.

East Helena Valley has been experiencing steady human population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. These factors could lead to increased public pressure to alter travel planning to accommodate either more, or less motorized use.

The majority of BLM managed routes for the East Helena Travel Planning area are located in or adjacent to the McMaster Hills/Spokane Bay, Mt. Bend, and North Hills sub-planning areas. As with the Scratchgravel Hills (Helena TPA), these areas are surrounded by residential development, and have experienced steady residential development over the past 15-20 years. This combination of rapid urbanization and increased recreational use has led to increased social conflict; between area residents and recreation users, and among recreational users themselves (motorized/non-motorized). As a result, there have been public demands to alter the existing travel management for these areas, to accommodate either more, or less motorized use. The remaining routes for the TPA are located in the Spokane Hills and Townsend sub-travel planning areas. The Spokane Hills and Townsend sub-travel planning areas are more rural in character, but also have potential for urbanization.

Recreation use is well established in the TPA. Primary recreation activities include water based activities, big game hunting, non-motorized uses (hiking, jogging, horseback riding, mountain biking, etc.), and OHV uses (ATV, motorcycle). As recreation use grows, conflicts between non-motorized and motorized recreation users could lead to increased public demands for either more, or less motorized use.

Spokane Creek (Hauser Lake) is an important habitat for spawning fish. Portions of the TPA (North Hills, areas adjacent to Canyon Ferry and Hauser Lakes) provide winter range for mule deer and elk. Concerns could lead to demands to restrict motorized use in these areas.

The Lewis and Clark National Historic Trail, proposed Spokane Creek ACEC, and Missouri River eligible WSR segment (3 mile portion located below Hauser Dam) being considered in the RMP revision are located within the TPA. These special designations could influence (restrict) travel management for existing roads and trails as well as for new proposed roads and trails.

In some site specific cases, visual resource management may affect or restrict new road/trail construction.

Urban development may lead to an increase in right-of-way permits to accommodate private property/development access. As a result, public access to BLM lands, via these rights-of-ways, could increase as well.

Limits or reductions in the BLM's funding and ability to maintain designated routes could lead to an overall reduction in open road miles.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuels reduction projects, could affect travel management. Forest management activities from 1984 to present include 250 acres of fire replanting and 250 acres of timber salvage. Future wildland fire management

activities include a 500-1,500 acre mechanical and/or prescribed fire treatment for the North Hills, focused on the urban interface areas. This project is anticipated to begin in 2009, and last several years. Depending on the type and scope of project, effects could vary from temporary, short-term area/route closures, to new opportunities (new routes) for motorized or non-motorized access.

Active claims are common in the areas with high potential and there are active notices in the travel planning area as well. Increases in mineral prices could lead to increased or renewed mining activity. Depending on the type and scope of mining activity, effects could vary from temporary, short-term area/route closures, to increased opportunities (new routes) for motorized or non-motorized access.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Motorized activities play a large role in the distribution of noxious weeds. Concerns over the spread of noxious weeds could influence travel management, and lead to fewer motorized opportunities.

Motorized use on dirt roads and trails is a major contributor to soil erosion and stream sedimentation. These concerns may influence travel management, and result in fewer motorized opportunities. This is an important consideration in the East Helena area as the Montana Department of Environmental Quality is working on water quality restoration plans in the area.

Trash dumping, drug use, underage alcohol use, unattended camp fires, and vandalism occur throughout the travel planning area, but especially in the rural/urban interface areas. Most of these activities are directly associated with motorized use. Continuing concerns with illegal activities may influence travel management and lead to fewer motorized opportunities.

The Bureau of Reclamation (BOR) manages approximately 11,500 acres of land surrounding Canyon Ferry Reservoir. BOR actions (such as new recreation site developments) could influence travel management on adjacent BLM lands as well, exerting pressure for either more or less motorized access.

For perspective, BLM managed lands represent approximately 10 percent of the total travel planning area (200,991 total acres, 20,039 BLM acres); while BLM managed routes represent approximately 8 percent of the total routes available (892.2 total miles, 70.7 miles BLM roads/trails). Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use).

As a result, BLM routes available to motorized use could experience increased use from displaced users, leading to more concentrated use, increased resource

impacts, user conflicts, and pressure to reduce motorized use.

Under all alternatives, overall increases in human population, urbanization, recreation use, user conflicts; and concerns for wildlife, noxious weed spread, soil erosion/water quality, and illegal activities are likely to lead to increased demands to restrict motorized travel, particularly in areas with urban development, such as the McMaster Hills/Spokane Bay, Mt. Bend, and North Hills areas. Under Alternative A, as urbanization continues and both motorized (wheeled and snowmobile) and non-motorized use increases, user conflict would increase in the East Helena TPA. Under the action alternatives, separate use areas and decreased road density would reduce user conflicts. Under Alternative B, these pressures would have less impact on travel management than under Alternatives A and D, due to the overall reduction in motorized opportunities and separation of uses. Under Alternative C, these pressures would have the least impact on travel management than under the other alternatives, due to the reduction in motorized opportunities. Under Alternative D, these pressures may lead to increased demands to restrict motorized travel, particularly in areas with urban development, such as the McMaster Hills/Spokane Bay, Mt. Bend, and the North Hills areas.

TRANSPORTATION FACILITIES

For the sake of this discussion, "open" roads include roads that are open yearlong as well as those that are open with seasonal restrictions.

Effects of Alternative A

Under Alternative A, the East Helena TPA would have 44.3 miles of open roads and no motorized trails (**Table 4-66**). Estimated costs for annual maintenance and stabilization of roads under Alternative A would be similar to Alternative D and much less than under Alternatives B and C. Estimated annual costs for monitoring, compliance and weed control would be higher than under the action alternatives, but close to the same as under Alternative D.

Effects of Alternative B

Under Alternative B, the East Helena TPA would have 17 miles of open roads and no motorized trails (**Table 4-66**). Estimated costs for annual maintenance and stabilization of roads under Alternative B would be less than under Alternatives A and D but more than under Alternative C. Estimated annual costs for monitoring, compliance and weed control would also be less than under Alternatives A and D but more than under Alternative C.

The addition of a non-motorized trailhead at the end of route 50108 in the North Hills and on the ridge top near the end of EH 037 in the Big Bend area would result in an increase in transportation facility costs for trailhead

Table 4-66				
East Helena TPA Route/Trail/Maintenance Costs				
Classification/ Cost	Alt A	Alt B	Alt C	Alt D
Miles of Open/ Restricted Roads	44.3	17	12	37.9
Motorized Trails	0	0	0	0
Annual Roads Maintenance	\$3,544	\$1,360	\$960	\$3,032
Annual Trails Maintenance	\$0	\$0	\$0	\$0
Periodic Road Stabilization	\$1,418	\$544	\$384	\$1,213
Periodic Trails Stabilization	\$0	\$0	\$0	\$0
Monitoring/ Compliance	\$2,215	\$850	\$600	\$1,895
Weed Control	\$665	\$255	\$180	\$569

development and maintenance. Designation of the “hunters with a disability” access in the South Hills would also represent an increase in transportation facility costs for signage and sign maintenance. These increases would be offset by reduced costs associated with having fewer open road miles to maintain in the long-term.

Effects of Alternative C

Under Alternative C, the East Helena TPA would have 12 miles of open roads and no motorized trails (Table 4-66). Estimated costs for annual maintenance and stabilization of roads under Alternative C would be the least of all the alternatives due to the least number of motorized routes. Estimated annual costs for monitoring, compliance, and weed control would also be less than under the other alternatives.

There would be a short-term increase in transportation facility costs under Alternative C resulting from the increase in signage required to mark closed and restricted routes. Indirect costs associated with sign maintenance and replacement would be greater under Alternative C than under the other alternatives; however, this effect would be short term because the public would become accustomed to the route changes over time.

Effects of Alternative D

Under Alternative D, the East Helena TPA would have 37.9 miles of open roads and no motorized trails (Table 4-66). Estimated costs for annual maintenance and periodic stabilization of roads under Alternative D would be similar to Alternative A, and less than under Alternatives B and C. Estimated annual costs for monitoring, compliance and weed control would be less under Alternative D than Alternative A and more than under Alternatives B and C.

Constructing several new designated routes under Alternative D would result in a short-term increase in transportation facility costs for the signage and potentially for more culverts, and a long-term increase for route maintenance associated with new routes. These costs would be offset in the long-term by reduced costs associated with having fewer road miles to maintain than under Alternative A.

Relocation of the trailhead in the Spokane Hills area would result in a short-term increase in transportation facility costs for trailhead development and signage.

LANDS AND REALTY

Effects Common to All Alternatives

The Butte Field Office administers approximately 62 rights-of-way (ROW) and 3 non-commercial occupancy leases within the boundaries of the East Helena TPA, which encumber approximately 1,609 acres of BLM land (Table 4-67). Various types of road rights-of-way are the most common type of grant, accounting for 34 percent, or about one third of the total. Other types of authorized uses include: oil and gas pipelines, lines for electrical distribution and telephone facilities, communication sites, ditches, railroads, and mineral material sites.

Table 4-67		
East Helena TPA ROWs/Leases		
Type	Approximate Number	Approximate Acres
Roads	21	746
Power	16	257
Telephone	12	45
O&G Pipelines	3	84
Comm. Sites	4	8
2920 Leases	3	1
Other	6	468
Totals	65	1,609

Approximately two right-of-way applications for new facilities as well as amendments, assignments, renewals, or relinquishments of existing right-of-way grants are processed annually in the TPA. This would not vary by alternative.

The general trend of granting rights-of-way is expected to increase through the planning period as a result of increasing public demands. From a cumulative effects standpoint, development of adjacent federal, state, and private land, increased recreational use and the trend of homeownership away from urban areas, coupled with traditional on-going uses, are all expected to require more guaranteed access involving public land.

SPECIAL DESIGNATIONS

There would be no effects to any special designation areas such as Wild and Scenic Rivers, Wilderness Study Areas, or Areas of Critical Environmental Concern under any of the travel plan alternatives for the East Helena TPA.

LEWIS AND CLARK COUNTY NW TPA

The 406,700-acre Lewis and Clark County Northwest TPA contains approximately 17,037 acres of BLM lands. There are approximately 68 miles of BLM roads, making up about 4.7 percent of the approximate total of 1,448 road miles in the TPA. The majority of roads (819 miles) lie on private lands.

SOILS

Effects Common to All Alternatives

Road construction, use, and maintenance affect soils in a number of ways. Soils are often compacted by these activities. Soil compaction can lessen the amount of precipitation that can infiltrate into soil and increase runoff, erosion, and sedimentation – in turn decreasing soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.

Ground disturbance associated with road construction, use, and maintenance can result in erosion. Erosion affects soil/site stability and hydrologic function. Erosion and sedimentation can destabilize the surface and subsurface cohesion of the soil, resulting in soil loss from erosion sites. Loss of soil can impede or prevent

establishment and development of vegetation communities.

Closing or decommissioning roads often leads to beneficial effects to soils through decreased site disturbance and re-establishment of vegetative cover on road surfaces. This tends to reduce soil erosion and stabilize soils. Decommissioning roads may in some cases entail ripping road surfaces to de-compact them, thus improving water infiltration, hydrologic function, and the ability of the treated area to revegetate more successfully.

Impacts to soils associated with site-specific travel plan alternatives were assessed based on the potential for soil erosion using the following erosion risk criteria:

- High – the area a route travels through has slopes greater than 30 percent gradient.
- Moderate – the area a route travels through has slopes ranging from 15 to 30 percent gradient; or, for granitic soils, slopes ranging from 0 to 30 percent gradient.
- Low – the area a route travels through has slopes ranging from zero to 15 percent gradient and soils are not granitic in origin.
- Unrated – road mapping not available at time of erosion impact rating.

Effects of the Alternatives

The distribution of road miles by erosion impact category and by proposed road management category for all the alternatives is shown for the Lewis and Clark County NW TPA in **Table 4-68**. Roads in the “unrated”

Table 4-68

BLM Road Miles in Soil Erosion Impact Categories by Alternative for the Lewis and Clark County NW TPA
(mileages are GIS-generated estimates)

Proposed Road Management	Erosion Risk Category	Alternative A	Alternative B	Alternative C	Alternative D
Open Road Miles (incl. Open w/restrictions)	High	45.6	20.1	12.6	24.6
	Moderate	16.0	5.9	6.1	7.9
	Low	0.2	0.2	0.2	0.2
	Unrated	2.4	1.9	0.9	1.8
Closed Road Miles	High	3.1	19.7	31.4	14.6
	Moderate	0.3	6.9	8.8	5.6
	Low	0	0	0	0
	Unrated	0.1	0.2	1.3	0.1
Decommissioned Road Miles	High	0	8.6	4.2	6.8
	Moderate	0	1.8	0.8	1.5
	Low	0	0	0	0
	Unrated	0	0	0	0.5

Note: Open roads include seasonally open roads as well as roads open yearlong.

category were excluded from detailed consideration and are shown for the purpose of displaying the extent of lacking information.

Most roads in this TPA are in either the high or moderate erosion impact category. Under current conditions (Alternative A) approximately 45.6 miles of open BLM roads are located in areas with high erosion risk, and 16 miles are in moderate erosion areas. Soil erosion would be reduced under Alternative B because this alternative would reduce those mileages in the high and moderate erosion categories to 20.1 miles and 5.9 miles, respectively. Approximately 26.6 miles of road in the high and moderate categories combined would be closed under Alternative B with an additional 10.4 miles in these categories being decommissioned. Vegetative recovery should occur to varying degrees on closed and decommissioned roads, with a beneficial effect on soils of reducing erosion from these areas.

Soil erosion would be reduced more under Alternative C than under any other alternative because the lowest mileage of roads in the high and moderate erosion categories would be left open (18.7 miles combined), while the greatest mileage in these categories would be closed (40.2 miles combined) of all alternatives. An additional 5 miles in these categories would be decommissioned under Alternative C.

Soil erosion associated with roads would be reduced under Alternative D compared to Alternative A, but would still be higher than under either Alternative B or C. Approximately 32.5 miles of BLM road in the moderate and high erosion categories combined would remain open under Alternative D, while about 20.2 miles in these categories would be closed and 8.3 miles would be decommissioned under this alternative.

Cumulative Effects on Soils

Cumulative effects to soils in the Lewis and Clark County NW TPA would arise from a number of past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 406,700-acre TPA, BLM lands comprise about 17,037 acres or 4 percent of total lands. The approximately 68 miles of BLM roads make up about 4.7 percent of the approximately 1,448 road miles in the TPA. Therefore road-related effects to soils described by alternative for BLM roads would affect about 4.7 percent of all roads in the TPA. The majority of lands and roads (over 50 percent of each) within the TPA boundary are private property. Non-BLM roads are managed by the county, Forest Service, state, and private landowners.

The Bald Butte Mine is located within this TPA. Currently this is a small scale open cut molybdenum mine of less than 5 acres in size on private land. It is anticipated to expand into approximately 5 acres of BLM land in the future and may occupy up to 30 acres of open area collectively at any one time in the future. Impacts to soils from this activity will include complete

soil removal and displacement, erosion, compaction, and covering by facilities. Reclamation work would provide for stabilization of soils in the aftermath of mining activity.

Approximately 1,961 BLM acres are permitted for various rights-of-way and leases. About 558 of these acres are for specific road rights-of-way. An additional approximately 1,050 acres are associated with the Great Divide Ski Area. The remaining 353 acres are associated with power lines, waterlines, communication sites, oil and gas pipelines, and other utility facilities. Impacts to soils range from compaction and occupation of ground with buildings, roadbeds, and other facilities, to revegetation and ground cover being re-established to stabilize soils. Much of the Great Divide Ski Area is a mosaic of ski runs and chair lifts nestled within forested or otherwise naturally vegetated areas. Impacts to soils from these features are minor.

From 1984 to 1995 timber harvest took place on about 82 acres of BLM land in this TPA (including timber salvage on 42 acres). From 1995 to the present timber harvest (predominantly selective harvest) has occurred on about 116 acres of BLM land in the TPA. Adverse effects on soils were generally minor with treated areas having undergone revegetation and soil stabilization since treatment. Timber harvest has also occurred on private and Forest Service lands and will likely continue for the foreseeable future, having localized compaction and erosion effects on soils.

From 1981 to 2004, wildland fire has burned across approximately 83 acres in the Lewis and Clark County NW TPA, creating a range of soil effects with more severely burned areas experiencing localized erosion and with other areas being relatively little affected.

There have been no fuels reduction treatments on BLM lands in the TPA in the last 10 years. While treatments of 1,500 to 3,000 acres (combination of mechanical and prescribed fire) may occur on BLM lands in the future, these treatments are not yet planned or designed. They would be designed to minimize effects to soils by minimizing compaction/disturbance from mechanical equipment and designing prescribed burns to be cool enough so as not to release nutrients from fuels but not scorch soils. Fuels treatments conducted on private and Forest Service lands will likely occur for the foreseeable future with variable effects to soils. Reducing fuels under the controlled conditions of deliberate treatments may benefit soils in the long-term by reducing the risk of high severity fires in treated areas.

Livestock grazing on public and private lands throughout much of the TPA has created areas of localized soil erosion and compaction, particularly in grassland and shrubland areas. This will continue to occur for the foreseeable future.

Increasing residential development will likely continue for the foreseeable future to variable degrees within the

TPA. Erosion, compaction, and covering of soils would occur due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments.

Under Alternative A, the contribution to cumulative effects on soils from BLM road management would continue as it occurs today. Retaining approximately 58 miles of road open yearlong and an additional 7 miles open with seasonal restrictions would allow for the same level of compaction and erosion impacts that currently exist.

From a BLM road management perspective, all action alternatives would benefit soil resources compared to Alternative A. Alternative B would benefit soils by providing for a reduced contribution to adverse cumulative effects than would Alternative A because about 55 percent of BLM roads would be closed or decommissioned under Alternative B (compared to 5 percent under Alternative A). Erosion should be reduced on these closed/decommissioned roads as disturbance is eliminated and revegetation occurs and stabilizes soils. Of the approximately 28 miles of open road under Alternative B, about 14 miles would be seasonally restricted from motorized vehicle use from 12/2 to 5/15. This would prevent erosion associated with motorized use during the wet snowmelt/runoff period.

Alternative C would benefit soils the most and provide for the least contribution to adverse cumulative effects on soils of all alternatives. This alternative would provide for closure or decommissioning of about 69 percent of BLM roads in the TPA, thus allowing these areas to vegetatively recover and stabilize soils. Of the approximately 20 miles of open road in this alternative, about 12 of those miles would be seasonally restricted (12/2 to 5/15) to exclude motorized use during the wet snowmelt/runoff period. This would prevent erosion associated with this wet season use.

Alternative D would provide for the greatest contribution to adverse cumulative effects on soils of the action alternatives, but would still provide for greater long-term benefits to soils than Alternative A. Alternative D would provide for closure or decommissioning (and subsequent vegetative recovery and/or soil stabilization) of about 43 percent of BLM roads in the TPA, compared to 5 percent for Alternative A, 55 percent for Alternative B, and 69 percent for Alternative C.

Due to the scattered distribution and relatively small proportion of BLM lands (4 percent) and roads (4.7 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on soils at the scale of the Lewis and Clark County NW TPA.

WATER RESOURCES

Effects Common to All Alternatives

There are a number of key concepts that are critical to understanding road effects to water resources.

Hydrologic function is an interaction between soil, water, and vegetation and reflects the capacity of a site to:

- Capture, store, and safely release water from rainfall, runoff, and snowmelt;
- Resist a reduction in this capacity; and
- Recover this capacity following degradation.

Interception of precipitation results when precipitation falls on vegetation. When vegetation is removed, precipitation falls directly on the soil. This can increase surface erosion and sedimentation, and decrease the amount of time between initial precipitation arrival and peak surface runoff – in turn decreasing soil/site stability and hydrologic function. Roads remove vegetation and therefore decrease interception of precipitation.

Infiltration is the process of precipitation entering and traveling through soil. Infiltration reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. Infiltration also filters precipitation and reduces erosion and sedimentation. If infiltration is reduced, runoff and erosion will increase and hydrologic function will decrease. Generally, roads are compacted surfaces that have decreased infiltration, thus increasing runoff and potentially increasing erosion.

Runoff can affect the amount of erosion and sedimentation, as well as flooding – both onsite and offsite. If runoff is increased, all of these effects can increase with a result that water quality and hydrologic function will decrease.

Increased sediment entering waterbodies increases turbidity, increases width-to-depth ratios, and consequently increases temperature and dissolved oxygen saturation levels, and creates an adverse habitat for aquatic animals and plants.

Alteration of flow routing can also affect water resources. For example, roadcuts into areas with relatively shallow groundwater can intercept groundwater, bring it to the surface, and transport it some distance (i.e. in a roadside ditch) before delivering it to a stream. This can lead to erosion of road ditchlines and subsequent sedimentation of streams during runoff periods, or increased thermal loading of water before delivery to streams during summer periods.

Closure and decommissioning of roads tend to reduce erosion and sedimentation effects stemming from roads on water quality. On an equivalent road mile basis, decommissioning roads would benefit water quality to a

greater degree than closing roads because the decommissioning process would often entail implementing measures to restore hydrologic function. During road decommissioning items such as compaction, drainage, stream crossing culverts, and ground cover are often addressed in a manner that markedly improves hydrologic function. These features are not fully addressed on roads that are merely “closed”. However, the reduced disturbance on newly closed roads combined with the tendency for revegetation to re-establish ground cover on them would reduce erosion and subsequent sedimentation effects to water quality.

Effects of the Alternatives

Generally, road density is an indicator of overall watershed health and function. Watersheds with higher road densities tend to have lower water quality due to greater disruption of hydrologic function (described above), and potential for erosion and subsequent sedimentation. Road density also is related to the distribution and spread of noxious weeds.

Table 4-69 shows acres of BLM land in three road density categories by alternative for the Lewis and Clark County NW TPA. These data reflect differences between alternatives based on roads proposed for “decommissioning” by alternative. While many “closed” roads would gradually contribute to increased hydrologic function over time, decommissioned roads would more directly contribute to hydrologic function because measures aimed at restoring hydrologic function would likely be part of the treatment during decommissioning. Alternative A would have the greatest

amount of BLM land with “high” road densities of greater than 2 mi/mi². Alternative B would have the lowest acreage in the high category with the greatest acreage in the low category of all alternatives. Alternative D would benefit hydrologic function more than Alternative C but less than Alternative B by virtue of its greater acreage in the low and moderate road density categories than Alternative C. Alternative C would have the highest acreage in the high road density category of the action alternatives. Overall, all the action alternatives would improve hydrologic function but by this measure Alternative B would make the greatest contribution to improved hydrologic function of all the alternatives, followed by Alternative D, Alternative C, then Alternative A.

Motorized routes within 300 feet of streams generally have greater potential to directly impact water quality through erosion and sedimentation, increased water temperatures (due to loss of shading vegetation), and direct alteration of stream channel morphology than those farther away. **Table 4-70** shows the miles of open and closed roads on BLM lands within 300 feet of streams by alternative. Under Alternative A there are about 7.4 miles of open road within 300 feet of fish bearing streams and an additional 5 miles within 300 feet of perennial non-fish bearing streams. All action alternatives would improve water quality by closing or decommissioning roads in close proximity to streams but Alternative C would provide for the greatest mileage. By this measure, Alternative C (total of 6.2 miles closed or decommissioned) would create the most benefit to water resources followed by Alternative B (5.4 miles), then Alternative D (4.6 miles).

Table 4-69			
Acres of BLM Land in Road Density Categories by Alternative for the Lewis and Clark County NW TPA			
TPA Alternative	Road Density Category		
	Low (<1 mi/mi²)	Moderate (1 to 2 mi/mi²)	High (> 2 mi/mi²)
Alternative A	2,614	3,444	10,979
Alternative B	3,075	4,526	9,436
Alternative C	2,693	4,076	10,268
Alternative D	2,935	4,446	9,655

Table 4-70				
Miles of Open and Closed Roads on BLM Lands within 300 ft. of Fish-Bearing Streams and Perennial, Non-Fish-Bearing Streams by Alternative for the Lewis and Clark County NW TPA				
TPA Alternative	Perennial Fish-Bearing Streams		Perennial Non-Fish-Bearing Streams	
	# Open Road Miles	# Closed Road Miles	# Open Road Miles	# Closed Road Miles
Alt. A	7.4	0	5.0	0
Alt. B	5.3	2.1	1.7	3.3
Alt. C	4.8	2.6	1.4	3.6
Alt. D	5.3	2.1	2.5	2.5

Note: Open roads include seasonally open roads as well as roads open yearlong. Closed roads include decommissioned roads.

Cumulative Effects on Water Resources

Cumulative effects to water resources in the East Helena TPA would arise from many past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 406,700-acre TPA, BLM lands comprise about 17,037 acres or 4 percent of total lands. The approximately 68 miles of BLM roads make up about 4.7 percent of the approximately 1,448 road miles in the TPA. Therefore road-related effects to water resources described by alternative for BLM roads would be associated with management of about 4.7 percent of all roads in the TPA. There are approximately 292 miles of fish bearing stream and an additional 238 miles of perennial non-fish bearing stream in the TPA. On BLM lands there are about 11 miles of fish bearing stream and an additional 11 miles of perennial non-fish bearing stream. The majority of lands and roads (over 50 percent of each) within the TPA boundary are private property. Non-BLM roads are managed by the county, Forest Service, state, and private landowners.

Many of the main access roads (non-BLM) follow valley bottoms and parallel streams. Many of these roads are directly affecting stream channel and floodplain function by filling or impinging on stream channels or floodplains, precluding the presence of riparian vegetation (including large woody material in forested locations), producing sedimentation in streams (from road surfaces, ditchlines, winter "road sanding" operations) and potentially increasing thermal loading by lessening streamside shade. These effects are dominant in shaping stream channel and water quality conditions in many areas and will continue into the foreseeable future.

Approximately 1,961 BLM acres are permitted for various rights-of-way and leases. About 558 of these acres are for specific road rights-of-way. An additional approximately 1,050 acres are associated with the Great Divide Ski Area. The remaining 353 acres are associated with power lines, waterlines, communication sites, oil and gas pipelines, and other utility facilities. Much of the Great Divide Ski Area is a mosaic of ski runs and chair lifts nestled within forested or otherwise naturally vegetated areas. Impacts to water resources are generally minor with some localized erosion and sedimentation and some contribution to decreased hydrologic function (decreased infiltration, increased runoff) due to compaction.

From 1984 to 1995 timber harvest took place on about 82 acres of BLM land in this TPA (including timber salvage on 42 acres). From 1995 to the present timber harvest (predominantly selective harvest) has occurred on about 116 acres of BLM land in the TPA. Adverse effects on water resources were minor from this activity. Timber harvest has also occurred on private and Forest Service lands and will likely continue for the foreseeable future. Ground disturbance from these activities will have localized impacts to water resources including

some sedimentation, loss of woody material recruitment for streams, and potential water temperature increases due to riparian shade loss.

From 1981 to 2004, wildland fire has burned across approximately 83 acres in the Lewis and Clark County NW TPA, having negligible effects on water resources.

There have been no fuels reduction treatments on BLM lands in the TPA in the last 10 years. While treatments of 1,500 to 3,000 acres (combination of mechanical and prescribed fire) may occur on BLM lands in the future, these treatments are not yet planned or designed. They would be designed to minimize effects to water quality by minimizing compaction/disturbance from mechanical equipment and designing prescribed burns to be cool enough so as not to scorch soils and facilitate severe erosion. Fuels treatments conducted on private and Forest Service lands will likely occur for the foreseeable future with variable effects to soils. Reducing fuels under the controlled conditions of deliberate treatments may benefit water resources in the long-term by reducing the risk of high severity fires that could have severe adverse water quality effects in treated areas.

Livestock grazing on public and private lands throughout much of the Lewis and Clark County NW TPA has created areas of localized streambank trampling, soil erosion and sedimentation, and nutrient inputs to streams. In severe cases stream channel morphology may be altered due to severe loss of riparian vegetation, loss of streambank integrity, channel widening and shallowing, and substantial sediment inputs. These effects to water quality will continue to occur for the foreseeable future. Agricultural water withdrawals occur on private lands in this TPA. These withdrawals reduce stream flows in the TPA, including within Little Prickly Pear Creek, one of several streams that flow through BLM lands and is listed as an impaired water body by MDEQ on the 303(d) list.

Several other streams listed as impaired by MDEQ flow through BLM lands in this TPA. Heavy metal contamination from abandoned mine lands has affected Virginia Creek, about 2 miles of which flows through BLM lands. The Blackfoot River (1.9 miles on BLM lands) is impaired by heavy metal contamination, sedimentation, and alteration of riparian vegetation. Probable sources of impairment include hard rock mining, agriculture, and timber harvest. Jennies Fork (0.2 miles on BLM lands) is impaired by lead contamination, nutrient inputs, and sedimentation. Probable sources of impairment are hard rock mining, riparian grazing, and roads. In the case of each of these impaired streams, BLM roads are not located in such a manner and are not a great enough proportion of ongoing activities as to play a substantial role in affecting water resource conditions.

Increasing residential development will likely continue for the foreseeable future to variable degrees within the

TPA. Erosion, soil compaction, and runoff would likely increase due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments. Nutrient, chemical pollutant, and pathogen inputs to streams would also likely increase due to leaching from septic systems, urban runoff (fertilizer, chemicals, and petroleum pollutants), and waste from livestock.

Under Alternative A, the contribution to cumulative effects on water resources from BLM road management would continue as it occurs today. Retaining approximately 58 miles of road open yearlong and an additional approximately 7 miles open with seasonal restrictions would allow for the same level of effects to water resources that currently exists.

From a BLM road management perspective, all action alternatives would benefit water resources compared to Alternative A. Alternative B would benefit water resources by providing for a reduced contribution to adverse cumulative effects than would Alternative A because about 56 percent of BLM roads would be closed or decommissioned under Alternative B (compared to 5 percent closed under Alternative A). Of the approximately 28 miles of open road under Alternative B, nearly one half of them would be seasonally restricted to exclude motorized vehicle use in the wet spring runoff period each year. This would reduce erosion from these roads and further benefit water resources.

Overall, Alternative B would likely benefit water resources the most and provide for the least contribution to adverse cumulative effects on water resources of all alternatives. Under this alternative the greatest mileage of BLM roads would be decommissioned (10.9 miles), benefiting hydrologic function to the greatest degree. Alternative C would provide for the greatest quantity of closed roads, but would only provide for 5.2 miles of decommissioning and would therefore have less benefit to hydrologic function. Alternative D would provide for 8.8 miles of decommissioning and would therefore have less benefits to hydrologic function than Alternative B, but more than Alternative C. Overall, Alternative D would provide for closure or decommissioning on about 43 percent of BLM roads in the TPA, compared to 5 percent for Alternative A, 56 percent for Alternative B, and 69 percent for Alternative C.

Due to the scattered distribution and relatively small proportion of BLM lands (4 percent) and roads (4.7 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on water resources in the Lewis and Clark County NW TPA.

VEGETATIVE COMMUNITIES – FOREST RESOURCES AND FOREST AND WOODLAND PRODUCTS

Effects of the Alternatives

Under all alternatives, existing roads and roads built to access timber and forest product sales on BLM lands may encourage timber harvest and forest product sales on adjacent lands, particularly where landowners and other agencies looking to improve economic efficiency or opportunities in the management on their lands.

In general, vegetative treatment contractors tend to bid more readily on projects in areas with vehicle access or valuable products. BLM often prioritizes forest vegetation management activities such as forest products and forest protection activities (e.g. wildfire suppression and forest insect and disease control) in similar areas.

Rehabilitation of roads (decommissioning and in some cases road closure) would revegetate currently unvegetated roadbeds, which would increase vegetation biomass production on the landscape through colonization of sites with grasses, forbs, shrubs, and trees. Increases in revegetated area would occur at a rate of approximately 1.5 to 3 acres per mile of rehabilitated road. Eventually rehabilitated roads would support plant communities consistent with site potentials which would help resist weed invasions. However, road closures and removals could make vegetation management treatments more difficult and costly, thereby inhibiting proposed treatments, reducing public access for product use and removal, and potentially slowing fire detection and suppression.

Under Alternative A there would be no increase in project analysis and implementation costs. However, under Alternative B approximately 55 percent of roads into forested areas would be closed. Under Alternative C about 69 percent of roads into forested areas would be closed, while under Alternative D about 43 percent of these roads would be closed. These closures would result in commensurate potential increases in vegetative analysis and treatment costs by alternative. These potential cost increases would be considered on a case by case basis by the BLM during project feasibility determinations, and additional funding may be needed to analyze and implement the projects that would remain feasible. Road closures could also result in potential decreases in quantities of forest products removed. The extent of the effects described above would be minimized because BLM would likely still be able to plan and implement projects in many areas on closed roads through the variance process for temporary road use. Road-related effects would be greatest under Alternative C, followed in sequence by Alternative B, then Alternative D.

Treatment projects that are small in nature or limited in scope such as vegetative manipulations of 50 acres or less, or restoration treatments removing only small proportions of stands (i.e. low intensity burns, selective thinning, interplanting), would have the greatest risk of becoming unfeasible in areas of closed roads under the action alternatives. However the higher productivity of the stands and higher value of the available products in most treatment areas in this TPA would be able of absorb the anticipated higher costs of treatments incurred by the BLM, and would increase the likelihood of successful project implementation.

Roaded access to forested areas would also affect the gathering of firewood and other forest products by the general public. The forested areas in the Marysville area are relatively heavily roaded and have received the highest public demand for forest products in the TPA due to their moderately productive forest and road accessibility. The smaller blocks of public land in the Stemple Pass area and the Sieben Ranch locality tend to be away from the main travel routes in their areas and thus being isolated, tend to have low demand for products. Most public parties prefer to drive close to areas of product removal so they do not have to carry products over long distances to their vehicles. With the low demand for products from the smaller blocks, implementation of alternatives B, C, and D would have little if any effect on product removal in those areas. However, Alternatives B, C and D would close roads in many forested portions of the Marysville area, generally restricting public searching for and removal of personal use and small products to motorized travel corridors along the main roads. For the Lewis and Clark County NW TPA, Alternative A would retain the most public opportunities for these activities, followed in sequence of decreasing opportunities by Alternative D, Alternative B, then Alternative C. Alternatives B and D would have similar effects to public access for forest product gathering.

Cumulative Effects on Forest and Woodland Resources and Products

The western spruce budworm is present and heavily affecting forests within the TPA at higher levels than experienced in the last twenty years, with high levels of defoliation occurring around Marysville and in the Virginia Creek area. This insect is currently reducing the health of Douglas-fir stands, such that other pests such as the Douglas-fir beetle can take advantage of the low vigor and reduced resistance in the trees, and become entrenched and kill trees in the infested stands. Current insect levels are expected to remain high in the future. This insect moves freely between Douglas-fir on all ownerships and open roads can assist with control. Alternative A would provide the highest opportunity for control on BLM lands and adjacent lands under other ownerships in the TPA. Alternative D would provide the

next greatest degree of opportunity, followed in sequence by Alternative B, then Alternative C.

Forested vegetation will also be affected by approximately 1,961 acres of rights-of-way and leases on BLM land. Forested vegetation located in these areas usually is harvested and/or removed to accommodate the necessary access or facilities. Forest vegetation removal will occur on new authorizations in the future and will occur as necessary to maintain sight distances and safety clearances associated with roads and facilities.

Urbanization is expected to continue on the 213,847 acres of private lands (53 percent of all lands) within this TPA. Forest products are commonly removed from these areas prior to permanent construction. Urbanization is likely to continue in the future and will affect forested vegetation at an unknown rate. As private construction increases, miles of road on private will most likely increase from the current 819 miles (57 percent of all roads in TPA).

Risk to forests from human-caused wildfires is commonly associated with open roads. Risk to forests from wildfire would be greatest under Alternative A with 64.2 miles of road open during the summer (and yearlong). Alternative B would have less risk of human-caused fire starts with about 28 miles of open road during summer. Alternative C would have the least risk to public forests with only 19.7 miles of road open during summer months. Alternative D (34.1 miles of open road during summer) would have more risk than either Alternative B or C, but less risk than Alternative A. Given that the majority of roads in the TPA (95.3 percent) are non-BLM roads, this contribution to reduced fire risk from BLM roads in the action alternatives is relatively small in the context of the entire TPA.

Since BLM roads constitute only 4.7 percent of all roads in this TPA, and BLM lands make up only 4.2 percent of all lands in the TPA, urbanization and activities on open non-BLM roads in the vicinity may have more cumulative effects on forested vegetation in the TPA than BLM decisions regarding miles of open and closed road.

VEGETATIVE COMMUNITIES – NOXIOUS WEEDS

Under all alternatives, any snowmobile use would have negligible effects on noxious weed spread and populations. Invasive noxious weeds and non-native species are degrading wildland health. These are aggressive plants that can outcompete many native plants, as they have few natural enemies to keep them from dominating an ecosystem. These plant species are spread by many means. However, any land disturbing activity in the TPA has the most potential to introduce and spread weed species. Motorized vehicles are one vector for noxious weed spread as weed seed and plant

parts become attached to vehicles and their tires, and are transported from one area to another where seeds become detached and germinate to inhabit new areas.

Effects of Alternative A

Under Alternative A, the majority of routes in the Lewis and Clark County NW TPA would be available for wheeled motorized use (57.5 miles open yearlong, 6.7 miles seasonally restricted, 3.4 miles closed). Area wide snowmobile (cross-country travel) use would be available on 16,997 acres. Under Alternative A the open BLM roads would represent about 4.7 percent of all open roads in the Lewis and Clark County NW TPA.

Alternative A would have the most roads open and in turn would promote the greatest amount of weeds and other undesirable plant spread and production. More herbicide control would be needed to control weeds under Alternative A than under the other alternatives.

Effects of Alternative B

Under Alternative B, a total of 28.1 miles of routes would be available for motorized wheeled use (13.8 miles open yearlong, 14.3 miles seasonally restricted). The majority of routes located in the Stemple Pass and Lincoln areas would be closed. This alternative would close 26.8 miles of road leaving 13.8 miles open yearlong as compared to 57.5 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase spread on the open routes because of the more concentrated use of these routes. Overall Alternative B would reduce weed spread, but would increase weed treatment costs per road mile on the remaining open roads compared to Alternative A. Under Alternative B the 28.1 miles of open BLM road (including seasonally restricted miles) would constitute about 2 percent of all open road miles in the Lewis and Clark County NW TPA.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized opportunities: 8.0 miles of routes open yearlong, and 11.7 miles seasonally restricted. Closure of the routes located in the northwest corner of the Marysville area would result in an enhancement of non-motorized opportunities and reduced weed spread there. Opportunities for cross-country snowmobile travel would be eliminated. Snowmobiles would be restricted to designated routes during the season of use (12/2-5/15), snow conditions permitting. This alternative would close 41.6 miles of road leaving 8.0 miles open yearlong as compared to 57.5 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase weed spread on the open routes because of the more concentrated use of these routes. Overall Alternative C would reduce weed spread

more than any other alternative, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. Under Alternative C the 19.7 miles of open BLM road (including seasonally restricted miles) would make up about 1.4 percent of all open roads in the TPA.

Effects of Alternative D

Under this alternative, a total of 34.1 miles of routes (19.6 miles open yearlong, 14.5 miles seasonally restricted) would be available for motorized use. Opportunities for ATV riders and hunters would be enhanced through the addition of a yearlong ATV-Only route and a game retrieval route. Motorized users would also have more opportunities in the Lincoln and Stemple Pass areas than under Alternatives B and C, facilitating continued weed spread via roads in these areas. Cross-country snowmobile travel would be allowed throughout the TPA with two exceptions, the Great Divide Ski area, and the northwest portion of the TPA. Travel in these areas would be restricted to existing routes only during the season of use (12/2-5/15), providing some dispersed recreation opportunities for non-motorized users. This alternative would close 20.3 miles of road leaving 19.6 miles open yearlong as compared to 57.5 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. The 34.1 miles of open BLM road (including seasonally restricted routes) would make up about 2.4 percent of all open travel routes in the Lewis and Clark Northwest TPA.

Cumulative Effects on Noxious Weeds

Under all the alternatives, other past, present, and reasonably foreseeable future BLM and non-BLM actions affect noxious weeds.

Recreation use is well established in the TPA, especially for winter sports. Winter sport activities include: snowmobiling, downhill skiing, backcountry skiing, ski racing, snowboarding, and snowshoeing. An extensive network of roads and trails support a wide range of off-season activities. Non-winter motorized activities are also common in the TPA. Motorized recreation uses are one of the leading causes of introduction and spread of noxious weeds and non native species. Weed seeds are transported by many recreational vectors i.e. motorized vehicles including their tires, non-motorized vehicles including their tires, pack animals, and humans.

Urban development may lead to an increase in right-of-Way permits to accommodate private property/development access. As a result, soil disturbing activities (i.e. roads, power lines, telephone lines, etc.), will increase causing weeds to increase.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuels reduction projects, could affect weeds in the TPA. There have been no fuels treatments in this area in the last 10 years. There are fuels treatments scheduled for planning for this area in the next five years, mainly in the general area around Marysville. These treatments would consist of mechanical and/or prescribed burning from 1,500 to 3,000 acres focused on the urban interface areas. Any project creating soil disturbance has the capability to increase weedy plant species. Prescribed burning projects give the ground surface a fertilization effect and eliminate some plant competition for weedy species giving them a niche for establishment and expansion in some areas. Ground-disturbing equipment could also transport noxious weed seed to these project sites. BLM implements weed control measures in the aftermath of such ground-disturbing activities so as to minimize noxious weed spread.

Wildland fires create good seed beds and supply nutrients for weed species introduction and production. From 1981 to 2004 there have been 14 wildland fires that burned approximately 83 acres. These areas likely experienced an increase in weed spread.

Historical information indicates that since 1977, 3,357 claims have been made throughout the Marysville area. Today only 40 claims remain active, including the Bald Butte Mine, an open cut molybdenum mine. While currently a small scale operation (5 acres), there is a strong likelihood that Bald Butte will expand onto approximately 5 acres of BLM land in the future, and as many as 30 acres of open area collectively at one time. Activity began in 2006, and is anticipated to continue until at least 2015. Mining is a land disturbing activity and the activity itself and weed seed contaminated equipment that is used could promote weeds in the area.

Noxious weeds and non-native invasive species are well established and spreading in the area. Weed control activities by BLM and other entities, while often effective at reducing or minimizing weed spread and weed populations, can also lead to some weed spread. Herbicide spray equipment is driven through weed infestations and weed seeds as well as other weed vegetative parts are spread to other lands during and following treatment. Herbicide and biological control treatments in recent years have been accomplished on approximately 20 to 30 acres in the Marysville area of the TPA. These weed treatments have varying success in killing undesirable plants, depending on many environmental parameters.

Timber sales have built-in stipulations for mitigating weed production and spread. However, with ground disturbance the potential exists for weed introduction to occur on these sites. Vehicular access for tree plantings could contribute to the spread of existing weeds on site. Since 1995 there have been 24 acres of timber salvage, 92 acres of timber harvest, and 48 acres of forest

planting (replanted in 1998). Herbicide treatment of existing weeds is coordinated with tree seedling planting locations and timing, so as to minimize potential exacerbation of weed spread.

Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, BLM routes available to motorized use could experience increased use from displaced users, leading to more concentrated use and the potential for increased weed spread.

The TPA includes important wildlife habitat. The western half of the TPA is a wildlife movement corridor between the Northern Continental Divide Ecosystem and the Greater Yellowstone Ecosystem. Portions of the TPA are in the occupied range of grizzly bear range. Mule deer winter range is located along the eastern half of the TPA (158,140 acres) as well as near Lincoln (21,500 acres). Elk winter range is also located in the lower elevations along the eastern half of the TPA (193,800 acres) as well as around Lincoln (55,500 acres). Noxious weed seeds are transported and spread by wildlife through their digestive system and by attaching to the animals themselves and then being released at a later time.

Livestock grazing on and off BLM lands also contributes to weed spread either through seed being introduced/spread by livestock themselves, or through vehicular uses needed to manage grazing operations.

The majority of BLM routes in the Lewis and Clark County NW TPA are located in and around the town of Marysville, located approximately 25 miles northwest of Helena, Montana. Much of the use in the Marysville area (especially winter use) comes from Helena Valley residents. The Helena Valley has been experiencing steady human population growth. This trend is expected to continue, along with increased recreational use of this TPA. These factors could lead to increased public pressure to alter travel planning. The remaining BLM managed routes are located in three sub-planning areas: Stemple Pass, Sieben Ranch, and Lincoln (west of the small town of Lincoln, Montana). There is some residential development adjacent to the Lincoln sub-planning area that could influence travel management. The increasing population in the Helena area will in turn lead to an increase in use of this TPA creating more opportunities for weed spread and production.

The Marysville area is experiencing increased residential development, but to a lesser extent than the central Helena Valley area. This development/increase in population has led to an increase in use of the TPA by residents living adjacent to or within this area which in turn leads to an increase in weed spread and propagation. About 4.7 percent of all the open travel routes in the Lewis and Clark county NW TPA are located on BLM managed lands (under Alternative A).

Lands near roads and away from roads in the TPA are infested with weeds. The travel on these roads is spreading weeds and weeds off these roads are being spread by the weed plants themselves and other natural means. Because the majority of roads (95.3 percent) and lands (95.8 percent) in the TPA are non-BLM, activities in these areas play a stronger role than activities on BLM lands in determining the status of weed spread and weed populations in the TPA overall.

VEGETATIVE COMMUNITIES – RIPARIAN VEGETATION

Effects Common to All Alternatives

This section focuses on effects to riparian vegetation. For additional discussion of effects to water quality and stream channels, see the Water Resources and Fish sections.

Roads in riparian areas constitute ground disturbance that can eliminate or preclude presence of native riparian vegetation. This ground disturbance and loss of riparian vegetation may facilitate erosion and sedimentation of streams. Roads may also interfere with natural stream channel functions by occupying floodplains or active stream channel margins (see Water Resources section for more discussion). Noxious weeds may dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation. Noxious weed seed can be spread into riparian areas by motor vehicles via open roads. Closure of roads and trails can improve or maintain riparian condition by reducing avenues of noxious weed spread, as well as allowing for bare area re-vegetation which filters sediment in addition to stabilizing banks in some areas. Road and trail restrictions have the same effects but to a lesser degree, because some traffic will inhibit vegetation growth and recovery.

Effects of the Alternatives

As a means of comparing alternatives, **Table 4-71** depicts the miles of wheeled motorized routes that cross or are within 300 feet of streams or wet areas on BLM lands for the Lewis and Clark County NW TPA.

Under Alternative A, 19.6 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas, and 0.4 miles of roads and trails would have seasonal restrictions. The noxious weed spread, streambank, and sediment delivery effects would continue as described in the Effects Common to All Alternatives section for the open roads. The BLM roads and trails most affecting riparian conditions along Ottawa Gulch, Woodchopper Gulch, Empire Creek, and Towsley Gulch would remain open. Alternative A would have the greatest adverse effects on riparian vegetation of all alternatives.

Table 4-71
Miles of Roads and Trails by Proposed
Management Category Within 300 feet of
Streams (including intermittent streams) in
the Lewis and Clark County NW Travel
Planning Area

Miles of Wheeled Motorized Routes	ALT A	ALT B	ALT C	ALT D
Open	19.6	5.1	4.1	7.8
Restricted	0.4	3.4	2.8	3.4
Closed	0	11.5	13.2	8.8

Under Alternative B, 5.1 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas; 3.4 miles of roads and trails would have seasonal restrictions; and 11.5 miles of roads and trails near riparian areas would be closed. The noxious weed spread, streambank, and sediment delivery effects would continue as described in the Effects Common to All Alternatives section for the open roads. The BLM trail that travels up Woodchopper Gulch would be closed which would allow the serious erosion problem there to re-vegetate. Additionally, a number of smaller riparian areas would improve in condition from road and trail closures. Roads and trails most affecting riparian conditions along Ottawa Gulch, Empire Creek, and Towsley Gulch would remain open for access purposes. Alternative B would benefit riparian vegetation greater than Alternative A as the closed riparian roads would have some opportunity to revegetate and stabilize.

Under Alternative C, 4.1 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas, 2.8 miles of roads and trails would have seasonal restrictions, and 13.2 miles of roads and trails near riparian areas would be closed. The noxious weed spread, streambank, and sediment delivery effects would continue as described in the Effects Common to All Alternatives section for the open roads. As under Alternative B, the BLM trail that travels up Woodchopper Gulch would be closed which would allow the serious erosion problem there to re-vegetate. Additionally, a number of smaller riparian areas would improve in condition from road and trail closures. Roads and trails most affecting riparian conditions along Ottawa Gulch, Empire Creek, and Towsley Gulch would remain open for access purposes. Alternative C would provide the most benefit to riparian vegetation than all other alternatives.

Under Alternative D, 7.8 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas, 3.4 miles of roads and trails would have seasonal restrictions, and 8.8 miles of roads and trails near riparian areas would be closed. The noxious weed spread, streambank, and sediment delivery effects would continue as described in the Effects Common to

All Alternatives section for the open roads. As under Alternatives B and C, the BLM trail that travels up Woodchopper Gulch would be closed which would allow the serious erosion problem there to re-vegetate. Additionally, a number of smaller riparian areas would improve in condition from road and trail closures. Roads and trails most affecting riparian conditions along Ottawa Gulch, Empire Creek, and Towsley Gulch would remain open for access purposes. Alternative D would provide greater benefits to riparian vegetation than Alternative A, but less than either Alternatives B or C.

Cumulative Effects on Riparian Vegetation

Noxious weed spread, mining, roads and trails, logging operations, and livestock grazing have affected riparian resource conditions in all TPAs, including the Lewis and Clark County NW TPA. Some of these factors continue to cause riparian area degradation primarily through direct disturbance or loss of riparian vegetation. Ground disturbance and loss of riparian vegetation facilitate erosion and sedimentation of streams. In the case of noxious weeds, they usually dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation.

Anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will increase severity of runoff events which in turn will cause more sediment delivery to creeks and streams. The additional sediment is likely to affect the functioning condition of some riparian areas by causing streambeds to aggrade at unnatural rates. Streambanks may also be affected if road placements do not allow for natural stream movements or meanders.

Logging and forestry practices on public and private lands are subject to streamside management zone (SMZ) requirements designed to maintain water quality and riparian vegetation. The proposed Riparian Management Zones under Butte RMP Alternatives B and C would be wider than SMZs and activities in these areas would be designed to benefit riparian resources, thus providing more riparian protection and more targeted management of riparian vegetation in both forested and non-forested areas than under RMP Alternatives A and D. The disturbance associated with timber activities does have the potential to increase noxious weed spread which degrades riparian area function and health. On public lands noxious weed control is a standard feature of any ground disturbing activities whereas on private lands noxious weed control is variable.

Livestock grazing will continue in the area and has the potential to impact riparian resource conditions. On BLM lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain riparian vegetation health and vigor. On private lands, livestock grazing is

expected to decline slowly as more ranch and farmland is subdivided. Riparian conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, riparian conditions would improve because of the streambank protection gained from shrubby root systems and filtering capability of native riparian sedge and rush species.

A molybdenum mine was started on private land above Bald Butte. The mine may expand on other private and public lands in the future. The mine is at the headwaters of American Gulch and Dog Creek. Mine road traffic and maintenance has the potential to add extra sediment into the Ottawa Gulch and Dog Creek drainages.

Abandoned mine lands were reclaimed in the Empire Creek and Piegan Creek watersheds in the 1990's. Riparian vegetation has recovered and improved in both drainages.

A number of privately owned blocks of land in the Dog Creek and Ottawa Creek drainages were logged within the past 20 years. Riparian vegetation was impacted at that time but has recovered to some degree.

Cumulatively the positive effects of Alternative B would be more than Alternative A. The closure and restrictions on 14.9 miles of roads would improve riparian conditions on several reaches. This may mitigate some of the predicted subdivision and potential mine road impacts.

Cumulatively the positive effects of Alternative C would be more than under either Alternatives A or B. The closure and restrictions on 16 miles of roads would improve riparian conditions on several reaches. This may mitigate some of the predicted subdivision and potential mine road impacts.

Cumulatively the positive effects of alternative D would be more than under Alternative A, but less than under either Alternatives B or C. The closure and restrictions on 11.4 miles of roads would improve riparian conditions on several reaches. This may mitigate some of the predicted subdivision and potential mine road impacts.

Overall, because BLM roads make up only 4.7 percent of all roads in the TPA (under Alternative A), and BLM lands make up 4.2 percent of all lands in the TPA, the contributions to riparian vegetation benefits associated with closing riparian roads on BLM lands would be relatively minor at the scale of the entire Lewis and Clark County NW TPA. Activities on private lands (53 percent of total acreage in TPA) and USFS lands (35 percent of total acreage in TPA) would play a dominant role in determining riparian conditions at the scale of the entire TPA.

WILDLIFE

Effects of Alternative A

Under Alternative A, the Lewis and Clark TPA would have more considerably more open roads (64 miles) compared to the action alternatives and would have the highest actual road density in elk winter range, 2.6 mi/mi² (Table 4-72) compared to the action alternatives. Open roads typically increase the level of recreation adjacent to roads. This can result in additional disturbance and displacement of wildlife species. Roads can also encourage the public to recreate in areas that had formerly been secluded. Roads can cause direct mortality to wildlife through road kill, prevent wildlife movement, create disturbance to wildlife via vehicular use, cause the spread of noxious weeds, reduce habitat and cause habitat fragmentation on the landscape. Permanent and temporary roads could negatively impact wildlife including special status species, particularly if roads are open during critical periods such as in lynx winter habitat and during the summer months within occupied grizzly bear habitat.

High open road densities under Alternative A could result in the loss of year-round habitat and migration corridors, disturbance and displacement of wildlife, road kill and fragmentation of habitat. Wildlife, including special status species, that are especially sensitive to roads in the TPA include (but are not limited to) elk, grizzly bear, lynx, wolverine and some raptors. The detrimental effects of open road densities to wildlife under Alternative A could be minor to major and long-term. This alternative would have the greatest negative impacts to wildlife including special status species from open roads.

Under Alternative A, this TPA would have substantially fewer acres of functional winter range (2,241 acres of area with low road density) compared to the action alternatives (Table 4-72). Alternative A would cause more disturbance and displacement of big game in winter range than all other alternatives.

Table 4-72 Decision Area Road Densities (mi/mi²) within Elk Winter Range in the Lewis and Clark County NW Travel Planning Area by Alternative				
	Actual Road Density	Acres of Low Road Density	Acres of Moderate Road Density	Acres of High Road Density
Alt. A	2.6	2,241	3,424	10,263
Alt. B	0.9	4,945	4,283	7,060
Alt. C	0.7	6,245	4,722	5,321
Alt. D	1.2	3,828	4,597	7,862

Low Density = 0-1 mi/mi², Moderate Density = 1-2 mi/mi², High Density = >2 mi/mi²

Under Alternative A, approximately 900 acres of the Lewis and Clark TPA would be closed to snowmobile use with the remaining 17,000 acres open for cross country snowmobile use. Snowmobiling occurs in both the Decision and Planning Areas and the use of snowmobiles could have substantial negative effects to wintering big game, lynx, wolverine other wildlife species. Cross-country snowmobile use could cause harassment of wildlife during the high stress winter season, which could lead to individuals leaving an area (temporarily or permanently) and/or an increase in stress that could lead to mortality. Alternative A would have more detrimental effects to wildlife from cross-country snowmobile use than the action alternatives.

In evaluating impacts of travel planning on elk and other big game species, it is important to consider impacts on security habitat. Elk security is the inherent protection allowing elk to remain in an area despite increases in stress or disturbance associated with the hunting season or other human activities. Security habitat includes blocks of nonlinear forested habitats greater than 250 acres in size that are at least 0.5 mile from an open road. Security habitat should also consist of larger trees (greater than 8 inches DBH) with vegetation dense enough to hide an adult elk. Under Alternative A, there would be no functional security habitat for big game species on BLM lands (Table 4-73). All of the action alternatives provide at least some security habitat on BLM lands.

Table 4-73 Decision Area Acres of Big Game Security Habitat in the Lewis and Clark County NW Travel Planning Area by Alternative				
	A	B	C	D
Lewis and Clark County NW TPA	0	1,510	2,183	701

Core areas are areas large enough for wildlife (especially animals with large home ranges such as carnivores and big game) to forage and reproduce. Subcore areas are areas that could act as stepping stones for wildlife as they move through the region. Within all lands of the Lewis and Clark TPA there are approximately 236,024 acres identified as "core/subcore" habitat. In core/subcore habitat under Alternative A, there would be 65,283 acres with low road density, 37,754 acres with moderate road density and 132,987 acres with high road density in the TPA for all land ownerships. Alternative A would provide the lowest quality core and subcore habitat across the landscape of all the alternatives due to open roads.

On BLM lands, there are approximately 12,349 acres in core/subcore habitat. Under Alternative A, there would be 1,244 acres with low road density, 2,419 acres with moderate road density, but the majority of acres have high road density (8,685 acres), within core and subcore habitat. On BLM lands, Alternative A would provide substantially lower quality habitat in core and subcore habitat due to open roads of all alternatives.

Wildlife corridors are areas of predicted movement within or between core and subcore areas. Within the Lewis and Clark TPA there are no areas in the TPA mapped as high quality wildlife movement corridors. There are 20,184 acres mapped as moderate quality movement corridors throughout the entire TPA. In moderate quality movement corridors under Alternatives A, B and D there would be 13,715 acres with low road density, 4,674 acres with moderate road density, and 1,795 acres would have high road densities. These alternatives would have fewer acres with low road density and more acres with high road density compared to Alternative C at the landscape level.

On BLM lands in the TPA there are only 831 acres mapped as moderate quality movement corridors. Under Alternatives A, B and D there would be 360 acres with low road density, 89 with moderate density, and 381 with high road density in moderate quality movement corridors. These alternatives would have fewer acres with low road density and more acres with high road density compared to Alternative C on BLM lands.

Riparian areas provide crucial habitat and critical travel corridors for wildlife including special status species. Riparian areas also provide a refuge for native plants and animals in times of stress such as drought or fire. Roads in riparian areas can prevent use of these crucial areas by wildlife, limit use or cause loss of habitat. Under Alternative A there would be 19.6 miles of open roads (roads within 300 feet of streams) in riparian areas.

Road densities within occupied grizzly bear habitat were analyzed using a moving windows analysis, which can more accurately evaluate road density. **Table 4-74** displays the results of the moving windows analysis within the Lewis and Clark TPA in both the Planning and Decision Areas. The moving windows analysis displays the acres in low, moderate and high road

densities. Higher densities of open roads can impact the quality and quantity of grizzly bear habitat. Research has indicated that grizzly bears underutilize habitat near roads and other human activities (Mace et al. 1996; McLellan and Shackleton 1989). Restricting motorized access can aid in minimizing negative impacts on bears related to disturbance and interactions with humans.

As shown on **Table 4-74**, occupied grizzly bear habitat in the Lewis and Clark TPA is dominated by acres with high road density in both the Planning and Decision Areas. However, the percentage of acres with low road densities is greater in the Planning Area (21 percent) compared to the Decision Area (6 percent). Alternative A would have substantially fewer acres with low road density compared to the action alternatives and would have the greatest negative effects to grizzly bears and other special status species from open roads.

The actual road density on BLM lands within occupied grizzly bear habitat overlaying the Lewis and Clark TPA would be 2.4 mi/mi² under Alternative A. Alternative A would have the highest road density in occupied grizzly bear habitat of all the alternatives and would have road densities above those recommended by MFWP. Montana Fish, Wildlife and Parks recommends that land management agencies manage for an open road density of 1 mi/mi² or less in grizzly bear habitat (this is consistent with MFWP's statewide Elk Management Plan guidelines as well).

Because Alternative A would have the least amount of closed roads compared to the action alternatives, this alternative would have higher road densities within occupied grizzly bear habitat of the Lewis and Clark TPA in both the Planning and Decision Areas than the action alternatives and would result in more negative effects to grizzly bears from open roads.

Effects of Alternative B

Under Alternative B, the Lewis and Clark TPA would have substantially fewer open roads (28 miles) compared to Alternative A (64 miles). Of the 28 miles of open roads, only 13.8 miles would be open year-round and the remaining 14.3 miles would be seasonally restricted. Alternative B would have more open roads than Alternative C (20 miles) but less than Alternative D (34 miles). Alternative B would decrease harassment to

Table 4-74
Road Density within the Northern Continental Divide Ecosystem Distribution Zone of Grizzly Bear

Travel Plan Area	Low Density (0-1 mi/mi ²)				Moderate Density (1-2 mi/mi ²)				High Density (2-3 mi/mi ²)			
	A	B	C	D	A	B	C	D	A	B	C	D
Lewis and Clark TPA Planning Area	64,231	67,482	68,256	66,028	82,972	84,436	84,370	84,878	158,291	148,752	146,901	150,781
Lewis and Clark TPA Decision Area	665	3,097	3,781	1,976	2,348	3,563	3,650	3,696	9,059	3,390	2,660	4,635

wildlife during all seasons of use but especially during the winter and spring compared to Alternatives A and D. This alternative would also improve habitat and reduce fragmentation more than Alternatives A and D, but less than Alternative C.

Under Alternative B, the actual road density in elk winter range in the Lewis and Clark TPA would be 0.9 mi/mi², less than the maximum of 1 mi/mi² recommended by FWP in big game winter range. This is substantially lower than the road density under Alternative A, 2.6 mi/mi², slightly higher than Alternative C (0.7 mi/mi²) and higher than Alternative D (1.2 mi/mi²) (**Table 4-72**).

Under Alternative B, this TPA would have more BLM acres of functional winter range (4,945 acres in the low road density category) compared to Alternative A (2,241 acres), less than Alternative C (6,245 acres) and more than Alternative D (3,828 acres) (**Table 4-72**). Alternative B would improve the quality and quantity of winter range in the Lewis and Clark TPA compared to Alternatives A and D but would have substantially fewer beneficial effects to winter range than Alternative C.

All alternatives would have 888 acres closed to cross country snowmobile use. Alternatives B and D would have 12,650 acres open to cross country snowmobile use which would be lower than the acres open under Alternative A (16,111 acres) but substantially more than would be open under Alternative C (0). Alternatives B and D would limit snowmobile use on 3,460 acres to open roads (49 miles). Alternatives B and D would have fewer negative effects to big game and other wildlife species than Alternatives A, but could have considerably more negative effects compared to Alternative C.

The amount of big game security habitat would be low, but still greater under Alternative B (1,510 acres) than Alternative A which would have no functional security habitat, and Alternative D which would have only 701 acres (**Table 4-73**). Alternatives B would increase security habitat for big game more than Alternatives A and D.

For all land ownerships, Alternative B would increase the amount of core and subcore habitat with low road density to 68,109 acres, compared to 65,283 acres under Alternative A. Alternative B would also increase the acreage with moderate road density (38,719 acres) over Alternative A (37,754 acres), but would decrease acreage with high road density (129,195 acres) compared to Alternative A (132,987 acres). Alternative B would substantially improve core and subcore habitat across the landscape more than Alternatives A and D but less than Alternative C.

On BLM lands in core/subcore habitat, Alternative B would substantially increase the acreage with low road density (3,608 acres) compared to Alternative A (1,244 acres). Alternative B would also increase the acreage with moderate road density to 3,022 acres compared to

Alternative A (2,419 acres) and would reduce the acreage with high road density to 5,719 acres compared to the 8,685 acres found under Alternative A. Alternative B would substantially improve core and subcore habitat on BLM lands in the TPA more than Alternatives A and D but less than Alternative C.

Effects of Alternative B on wildlife movement corridors would be the same as under Alternative A. Alternative B would protect and restore more riparian habitat than Alternative A by reducing the miles of open roads in riparian acres to 5.1 miles (from 19.6 under Alternative A). Alternative B would allow for more breeding, foraging and hiding habitat as well as improve more movement corridors for a wide variety of species than Alternatives A and D but less than Alternative C.

Under Alternative B, the actual road density within occupied grizzly bear habitat of the Lewis and Clark TPA and the Decision Area would be lower than under Alternatives A and D, but higher than under Alternative C. Under Alternative B, road densities in occupied grizzly bear habitat within the Lewis and Clark TPA would be 0.8 mi/mi² within the Decision Area. This would be below MFWP's maximum recommended road density in grizzly bear habitat of 1 mi/mi².

Road densities and open roads can impact the quality and quantity of grizzly bear habitat. Research has indicated that grizzly bears underutilize habitat near roads and other human activities (Mace et al. 1996; McLellan and Shackleton 1989). Restricting motorized access can aid in minimizing negative impacts on bears related to disturbance and interactions with humans.

Under Alternative B, grizzly bear habitat with acres of low road density within the Decision Area of the Lewis and Clark County NW TPA would be 26 percent (3,097 acres) of the total available habitat (**Table 4-74**). This would be a higher percentage of acres with low road densities compared to those available at the Planning Area level scale within the Lewis and Clark TPA (22 percent). This would be substantially more acres in low road densities than Alternative A (665 acres). Grizzly bears generally adjust to disturbance associated with roads by avoiding the area. This results in a reduction in the amount of habitat available to the bears in heavily roaded areas. Roads also provide increased access into remote areas and encourage human settlement, recreational use, and other land uses. These activities can increase the frequency of human-bear conflicts and ultimately reduce habitat availability and grizzly populations. By increasing low road density areas, Alternative B would provide more suitable habitat for grizzly bears than Alternatives A and D but less suitable habitat compared to Alternative C (**Table 4-74**).

Effects of Alternative C

Under Alternative C, the Lewis and Clark TPA would have substantially fewer open roads (20 miles) compared to Alternative A (64 miles). Of the 20 miles of open

roads, only 8.0 miles would be open year-round and the remaining 12 miles would be seasonally restricted. Alternative C would also have fewer open roads than Alternative B (28 miles) and Alternative D (34 miles). Alternative C would decrease harassment to wildlife during all seasons of use but especially during the winter and spring more than all other alternatives. This alternative would also improve habitat and reduce fragmentation more than all other alternatives.

Under Alternative C, the actual road density in elk winter range in the Lewis and Clark TPA would be 0.7 mi/mi², less than the maximum of 1 mi/mi² recommended by FWP in big game winter range. This is substantially lower than the road density under Alternative A (2.6 mi/mi²), slightly lower than Alternative B (0.9 mi/mi²), and higher than Alternative D (1.2 mi/mi²) (**Table 4-72**).

Under Alternative C, this TPA would have substantially more BLM acres of functional elk winter range (6,245 acres in low road density areas) compared to Alternative A (2,241 acres) and Alternative D (3,828 acres). This alternative would also have more acres of functional winter range than Alternative B (4,945 acres) (**Table 4-72**). Alternative C would improve the quality and quantity of winter range in the Lewis and Clark TPA more than all other alternatives.

As with Alternatives A, B and D, this alternative would have 888 acres closed to cross country snowmobile use. The remaining 16,111 acres would be limited to use on open routes (8 miles). This would greatly reduce the negative effects associated with snowmobile use to big game and other wildlife species more than all other alternatives because there would be no acreage open to cross country use.

Under Alternative C, the amount of big game security habitat on BLM lands (2,183 acres) would be greater than under any other alternative (**Table 4-73**).

For all land ownerships, Alternative C would increase the acreage of core and subcore habitat with low road density to 69,476 acres, compared to 68,109 acres under Alternative B and 65,283 acres under Alternative A. The acreage with moderate road densities would be similar under both Alternatives C and B (38,924 and 38,719 acres, respectively), but would be an increase over Alternative A (37,754 acres). Alternative C would decrease the acreage in high road density to 127,624 acres, which would be lower than Alternative B (129,195 acres) and Alternative A (132,987 acres). Alternative C would substantially improve core and subcore habitat across the landscape more than all other alternatives.

On BLM lands in core/subcore habitat, Alternative C would substantially increase the acreage with low road density (4,640 acres) compared to Alternative A (1,244 acres) and Alternative B (3,608 acres). Alternatives C and B would have similar acreages with moderate road

density (3,079 acres and 3,022 acres, respectively), which would be more than Alternative A (2,419 acres). Alternative C would also decrease the acreage with high road density to 4,631 acres, which would be lower than both Alternative A (8,685 acres) and Alternative B (5,719 acres). Alternative C would substantially improve core and subcore habitat on BLM lands in the TPA more than all other alternatives.

For all land ownerships in moderate quality movement corridors, Alternative C would increase the acreage with low road density to 13,812 acres, increase the acreage with moderate road density to 5,009 acres, and decrease the acreage with high road density to 1,363 acres. Alternatives A, B and D would have the same acreages with low (13,715 acres), moderate (4,674 acres), and high (1,795 acres) road densities.

Under Alternative C, BLM lands in moderate quality movement corridors would have more acreage with low road density (444 acres), more acreage with moderate road density (383 acres), and less acreage with high road density (3 acres) compared to Alternatives A, B and D. Alternatives A, B and D would have the same acreages in low 360 acres), moderate (89 acres), and high (381 acres) road densities. Alternative C would improve the quality of movement corridors more than all other alternatives.

Alternative C would protect and restore more riparian habitat than Alternative A by reducing the mileage of open roads in riparian areas to 4.1 miles (from 19.6 under Alternative A). Alternative C would also have fewer open roads in riparian area than Alternative B (5.1 miles) and Alternative D (7.8 miles). Alternative C would allow for more breeding, foraging and hiding habitat as well as improve more movement corridors for a wide variety of species than all other alternatives.

Under Alternative C, the actual road density within occupied grizzly bear habitat of the Lewis and Clark TPA and the Decision Area would be lower than with all other alternatives. Under Alternative C, road densities in occupied grizzly bear habitat within the Lewis and Clark TPA would be 0.6 mi/mi² within the Decision Area. This would be well below the maximum road densities recommended by MFWP of 1 mi/mi² or less in grizzly bear habitat.

Within occupied grizzly bear habitat, the number of acres with low road density in the Lewis and Clark TPA would be 31 percent (3,781 acres) of total available habitat (**Table 4-74**). This would be higher than the percent of habitat available at the Planning Area scale (22 percent). Alternative C would have substantially more BLM acres with low road density in occupied grizzly bear habitat than Alternative A (665 acres) and moderately more than Alternative D (1,976 acres). Alternative C would provide slightly more acres with low road density compared to Alternative B (3,097 acres).

Through travel management, Alternative C would provide the greatest benefit to grizzly bears and other special status species by reducing fragmentation of habitats, protecting larger blocks of habitat and reducing disturbance in occupied grizzly bear habitat.

Effects of Alternative D

Under Alternative D, the Lewis and Clark TPA would have considerably fewer open roads (34 miles) compared to Alternative A (64 miles). Of the 34 miles of open roads, 19.6 miles would be open year-round and the remaining 14.5 miles would be seasonally restricted. Alternative D would have more open roads than Alternative B (28 miles) and Alternative C (20 miles). Alternative D would allow more harassment to wildlife during all seasons of use, especially during the winter and spring, than Alternatives B and C but less than Alternative A. This alternative would also improve habitat and reduce fragmentation more than Alternative A but less than Alternatives B and C.

Under Alternative D, the actual road density in elk winter range in the Lewis and Clark TPA would be 1.2 mi/mi², more than the 1 mi/mi² recommended by MFWP in big game winter range. This is lower than the road density under Alternative A (2.6 mi/mi²), but higher than Alternative B (0.9 mi/mi²) and Alternative C (0.7 mi/mi²) (Table 4-72).

Under Alternative D, this TPA would have more BLM acres of functional winter range (3,828 acres in low road density areas) compared to Alternatives A (2,241 acres) but considerably less than Alternative B (4,945 acres) and Alternative C (6,245 acres) (Table 4-72). Alternative D would improve the quality and quantity of winter range in the Lewis and Clark TPA more than Alternative A but would have substantially fewer beneficial effects to winter range than Alternatives B and C.

Effects associated with snowmobile use under Alternative D would be the same as under Alternative B. The amount of big game security habitat on BLM lands would be low under Alternative D with 701 acres, but more than under Alternative A which would have no functional acres of security habitat. Alternative D would have fewer acres of security habitat than any other action alternative (Table 4-73).

For all land ownerships in core and subcore habitat, Alternative D would have more acreage with low road density (66,988 acres) compared to Alternative A (65,283 acres). Alternative D, however, would have fewer acres with low road density compared to Alternative B (68,109 acres) and Alternative C (69,476). The acreage with moderate road density under Alternative D (39,136 acres) would be more than with Alternative A (37,754 acres), Alternative B (38,719 acres) and Alternative C (38,924 acres). Alternative D would have fewer acres (129,900) with high road density than Alternative A (132,987 acres) but would have more

acres with high road density than Alternatives B (129,195) and Alternative C (127,624). Alternative D would improve core and subcore habitat across the landscape more than Alternative A but less than Alternatives B and C.

On BLM lands in core/subcore habitat, Alternative D would increase the acreage with low road density (2,706 acres) compared to Alternative A (1,244 acres), but would have considerably fewer acres with low road density than Alternative B (3,608 acres) and Alternative C (4,640 acres). Alternative D would have more acreage with moderate road density (3,192 acres) than Alternative A (2,419 acres), but less than either Alternative B or Alternative C. Alternative D would decrease the acreage with high road density to 6,452 acres compared to Alternative A (8,685 acres), but would have more acres with high road density than Alternative B (5,719 acres) and Alternative C (4,631 acres). Alternative D would improve core and subcore habitat on BLM lands in the TPA more than Alternative A but less than Alternatives B and C.

Effects of Alternative D on wildlife movement corridors would be the same as under Alternatives A and B.

Alternative D would protect and restore more riparian habitat than Alternative A by reducing the miles of open roads in riparian areas to 7.8 miles (from 19.6 under Alternative A). Alternative D would have more open roads in riparian areas than Alternative B (5.1 miles) and Alternative C (4.1 miles). Alternative D would allow for more breeding, foraging and hiding habitat as well as improve more movement corridors for a wide variety of species than Alternative A but less than Alternatives B and C.

The actual road density, under Alternative D, in occupied grizzly bear habitat within the Lewis and Clark TPA would be 1.3 mi/mi² within the Decision Area. This would be above the maximum MFWP recommended road density in occupied grizzly bear habitat of 1 mi/mi².

Under Alternative D, the percent of total available grizzly bear habitat with low road density in the Lewis and Clark TPA would be 19 percent (1,976 acres) (Table 4-74). This would be a lower percentage compared to the percentage available at Planning Area scale (22 percent). Alternative D would have more acres in low road density in occupied grizzly bear habitat than Alternative A (665 acres), but substantially fewer acres than Alternative B (3,097 acres) and Alternative C (3,781 acres).

Alternative D would provide more acres of suitable habitat for grizzly bears than Alternative A but fewer acres of suitable habitat compared to Alternatives B and C.

Cumulative Effects on Wildlife

Wildlife habitat in the Lewis and Clark TPA has been affected by roads, historic and current mining, timber

harvest, weed infestations, urbanization and development, recreation, power line corridor development, and communication sites.

The majority of BLM managed routes for the Lewis and Clark TPA are located in and around the town of Marysville, located approximately 25 miles northwest of Helena. The Marysville area is experiencing increased residential development, but to a lesser extent than the central Helena Valley area. Much of the use in the Marysville area (especially winter use) comes from Helena Valley residents. The Helena Valley has been experiencing steady population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. The remaining BLM-managed routes are located in 3 sub-planning areas: Stemple Pass, Sieben Ranch, and Lincoln.

Recreation use is well established in the TPA, especially for winter sports. Winter sport activities include: snowmobiling, downhill skiing (Great Divide Ski Area), backcountry skiing, ski racing, snowboarding, and snowshoeing. An extensive network of roads and trails support a wide range of off-season activities, including: camping, hunting, target practice, hiking, jogging, horseback riding, mountain bike riding, and motorized use (motorcyclists, OHV riders, and 4-wheel drive enthusiasts). As recreation use grows, conflicts between non-motorized and motorized recreation users could lead to increased public demands for either more, or less motorized use.

Since 1977, approximately 3,360 mining claims have been active throughout the Marysville area. Currently, only 40 claims are active, including the Bald Butte Mine, an open cut molybdenum mine. While currently a small scale operation (5 acres), there is a strong likelihood that Bald Butte will expand to approximately 30 acres in the future with roughly 5 acres on BLM lands. Activity began in 2006, and is anticipated to continue until at least 2015. Increases in mineral prices could lead to additional increased or renewed mining activity.

In the TPA, there are 17 power lines and 4 pipelines. There are eight existing communication sites in the TPA but, in the future, communication sites on BLM lands will be restricted to existing sites. No future communication sites are expected in the TPA on BLM lands but they could occur on private or other public lands. There is the potential for future power lines and pipelines to be built in this TPA.

There are approximately 44 rights-of-way (ROW) in the TPA and applications for ROW permits to access private property or for commercial development are likely to increase in the future. As a result, public access to BLM lands could increase. Fewer ROWs would be expected under Alternative A because more BLM roads would remain open under this alternative. Alternative B would be expected to have fewer ROWs than Alternative C but

more than Alternatives A and D. Alternative C would be expected to have the most ROWs and, of the action alternatives, Alternative D would have the fewest.

From 1981-2004 there have been 14 wildland fires that burned 83 acres of BLM lands (it is unknown how many acres burned in the entire TPA). Seven of the fires were identified as human-caused and these fires burned the majority of the BLM acres (75). Fuels reduction activities could occur around the town of Marysville. Timber harvest has occurred on approximately 130 acres of BLM lands in the TPA over the last 23 years and there have been approximately 70 acres of timber salvage. Vegetative treatments on BLM lands have had minor effects to wildlife habitat in the TPA. However, timber harvest, salvage, past mining activities and development on private lands have altered the landscape and may have caused a decline in the quality and quantity of wildlife habitat in the TPA.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the TPA. Motorized activities play a large role in the distribution of noxious weeds. The cumulative effects of the spread of noxious weeds from open roads would be greater under Alternative A than all other alternatives. Alternative A would result in more wildlife habitat being lost or degraded due to noxious weed infestations compared to the action alternatives. Alternative B would have fewer open roads than Alternatives A and D resulting in fewer infestations of noxious weeds. Alternative C would close the most roads and would have the fewest cumulative effects from loss of habitat due to noxious weeds of all alternatives. Open roads and development adjacent to BLM lands and the substantial amount of public use this area receives would still allow for the spread of noxious weeds.

Fragmentation of BLM lands in the TPA (only 4 percent in BLM ownership); open roads on BLM lands (about 68 miles), on private lands (about 900 miles) and other public lands (about 480 miles); as well as adjacent development has reduced the quality of wildlife habitat within the TPA. Large blocks of Forest Service lands (35 percent of TPA) are found in the TPA and do provide high quality wildlife habitat. However, open Forest Service roads as well as roads and development throughout the rest of the TPA cause disturbance to wildlife along with fragmentation and loss of habitat in the TPA. Roads are associated with nearly every type of activity that has the potential to occur in the TPA including vegetation treatments, timber salvage, mining, access to private lands (ROWs), fire suppression, power line corridors, and recreation. Open roads in the Planning Area would likely increase due to development and management of private lands. Alternative A would have the greatest negative cumulative effects to wildlife and wildlife habitat from open roads with 64 miles of open roads. Alternative B would have fewer negative cumulative effects with 28 miles of open road than

Alternatives A and D (34 miles) but more than Alternative C (20 miles).

Of the action alternatives, Alternative C would have the most beneficial cumulative effects by reducing habitat fragmentation, restoring habitat and reducing disturbance. Alternative B would be more beneficial than Alternatives A and D but less than Alternative C.

Historic and recent timber cutting (mostly on private lands), timber salvage, past and present mining activity and firewood gathering in the TPA have reduced the amount of suitable snag habitat for cavity nesting species. Alternative A would allow a substantial amount of access to the area for firewood cutting that would continue to prevent snag recruitment for snag dependant species and minimize the amount of down woody material. Alternative B would protect more snag and down wood habitat from loss due to firewood cutting than Alternatives A and D, but would protect less of this habitat type than Alternative C.

In the Lewis and Clark TPA high road densities in both the Decision and Planning Areas have prevented BLM lands from providing suitable security habitat for big game during the hunting seasons under Alternative A. Alternatives B and C would provide the most security habitat for big game on BLM lands (1,510 and 2,183 acres, respectively) and Alternative D would provide 701 acres. Security habitat would still be limited on private (unless closed to hunting) and other public lands. The reduction of open roads during the hunting season would help mitigate for the loss of security habitat on adjacent lands under Alternatives B and C.

Approximately 58 percent of the TPA is mapped as core and subcore habitat. All of the core and subcore habitat is in the western half of the TPA and is predominately Forest Service lands. Fragmentation of habitat due to development of private lands, open roads, and disturbance, has impacted the quality of core/subcore habitat and wildlife movement corridors in the TPA.

Habitat mapped as core and subcore habitat and wildlife movement corridors having high road densities would continue to be of lower value to wildlife under Alternative A. An increase in open roads in both the Decision and Planning Areas could result in a loss of core and subcore habitat under all alternatives but, especially, Alternative A. Although core/subcore habitat and wildlife movement corridors would continue to be impacted by development on private lands, Alternatives B and C would allow more BLM lands to function as core/subcore habitat and wildlife movement corridors. Alternatives B and C would have fewer negative cumulative effects to core/subcore and wildlife habitat than Alternatives A and D.

The cumulative effects of high road densities would continue to negatively affect wildlife species during the breeding season more under Alternative A than under the action alternatives. Alternatives B and C would have

the most beneficial cumulative effects to wildlife during the breeding season compared to Alternative D and, especially, Alternative A.

FISH

For the sake of this discussion, "open" roads include roads that are open with seasonal restrictions as well as roads that are open yearlong. Roads identified as "closed" within 300 feet of streams also include roads that would be "decommissioned" in these areas by alternative. Effects to water quality described in the Water Resources section would affect fish populations and fish habitat quality. Analyses described and tabulated in the Water Resources section are referred to in the context of effects to fish in the discussion below.

Effects of Alternative A

Under Alternative A, the Lewis and Clark TPA would have considerably more open roads (64 miles) compared to the action alternatives. Roads can have a wide range of effects on fish and fish habitat. These effects would include, but are not limited to, increased sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, conduits for noxious weeds, loss of riparian vegetation, potential decreases in stream shading that could lead to water temperature increases, and changes in local fish populations when culverts are impassable and limit fish migration.

Watershed (or hydrologic) function can be used as an indicator of relative risk or impacts to fish habitat. Generally, watersheds with high road densities often have the largest negative effects on fish and aquatic resources. To determine the effects on watershed function, a moving windows analysis was conducted on BLM lands to look at the miles of roads that would be decommissioned and removed from the landscape for each alternative. During this analysis, it was assumed that even though closing roads would improve watershed function, closed roads would remain on the landscape and could still have negative impacts to water quality and prevent or impede the restoration of riparian vegetation. Under Alternative A, there would be 2,614 acres with low road density, 3,444 acres with moderate road density and 10,979 acres with high road density on BLM lands in the TPA (**Table 4-69**). Alternative A would have fewer acres with low road density and more acres with high road density than the action alternatives. This alternative would be expected to have greater overall negative effects to watershed function due to roads than the action alternatives. For this discussion, road miles within 300 feet of fish bearing streams would be considered an indicator of direct effects to fish habitat and fish populations. Under Alternative A, there would be 0 miles of closed road and 7.4 miles of open road within 300 feet of fish bearing streams on BLM lands. Alternative A would have 2.1-2.6 fewer miles of closed roads (and the same number more of open road miles)

adjacent to fish bearing streams than the action alternatives. Of the 7.4 miles of open road adjacent to fish bearing streams under Alternative A, 4.6 miles are along streams with BLM special status fish species (bull trout and/or westslope cutthroat trout). Alternative A would have more long-term negative impacts to westslope cutthroat trout (the effects to bull trout would be the same for all alternatives) as well as to other fish species than the action alternatives.

Perennial non-fish bearing streams contribute to fish habitat indirectly by serving as conduits for watershed products (water, sediment, nutrients, contaminants, and in some cases woody material) to fish bearing streams. Under Alternative A, there would be 0.1 miles of closed road and 5.1 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. Alternative A would have substantially more miles of open road adjacent to perennial streams than Alternatives B (1.7 miles), C (1.4 miles) and D (2.5 miles).

This alternative would have the greatest negative impacts to fish and aquatic resources from open roads.

Effects of Alternative B

Under Alternative B, the Lewis and Clark TPA would have substantially fewer open roads (28 miles) compared to Alternative A (64 miles). Alternative B would have more open roads than Alternative C (20 miles) but less than Alternative D (34 miles).

In the context of watershed function, Alternative B would have approximately 461 more acres in the low road density category, 1,082 more acres in the moderate road density category, and 1,543 fewer acres in the high road density category on BLM lands than Alternative A (Table 4-69). Alternative B would contribute to improved watershed function more than Alternative A. This analysis does consider "decommissioned" roads, but does not consider "closed" roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative B, there would be approximately 23 more miles of closed roads than under Alternative A, an additional indication that Alternative B would pose less of an impact to fish habitat than Alternative A. Alternatives B and D would have 2.1 miles of closed road and 5.3 miles of open road within 300 feet of fish bearing streams on BLM lands. Of the 5.3 miles of open roads, 3.2 miles would be adjacent to streams with special status species (westslope cutthroat trout and/or bull trout). Alternative B would reduce effects to fish bearing streams (including streams with special status species) more than Alternative A because all of these riparian roads would remain open under Alternative A. Alternative B would contribute fewer

indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams than Alternative A. Under Alternative B there would be 3.3 miles of closed road and 1.7 miles of open road in these riparian areas on BLM lands. This would pose less impact to these areas than under Alternative A where all 5.0 miles would be open.

Alternatives B would have fewer road-related adverse effects to fish and aquatic habitats than Alternative A.

Effects of Alternative C

Under Alternative C, the Lewis and Clark TPA would have substantially fewer open roads (20 miles) compared to Alternative A (64 miles). Alternative C would also have fewer open roads than Alternative B (28 miles) and Alternative D (34 miles).

In the context of watershed function, Alternative C would result in approximately 79 more acres in the low road density category, 632 more acres in the moderate road density category, and 711 fewer acres in the high road density category on BLM lands than Alternative A (Table 4-69). This alternative would have 382 fewer acres in the low road density category, 450 more acres in the moderate road density category, and 832 more acres in the high road density category than Alternative B. Under Alternative C there would be approximately 38 more miles of closed roads than under Alternative A, and about 15 more miles of closed roads than under Alternative B. Alternative C would lessen effects to fish habitat through improved watershed function more than Alternative A, but less than Alternative B. Alternative C would have the most miles of closed roads (2.6) and the fewest miles of open roads (4.8) within 300 feet of fish bearing streams on BLM lands of all alternatives. Of the 4.8 miles of open roads, 2.9 miles would be adjacent to streams with special status species (westslope cutthroat trout and/or bull trout). In terms of direct effects from roads adjacent to fish bearing streams, Alternative C would have the most benefits to fish habitat of all alternatives.

Alternative C would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than all other alternatives. Under Alternative C there would be 3.6 miles of closed road and 1.4 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. This is a range of 0.3-3.6 more closed road miles in these areas than under the other alternatives.

Alternative C would provide more benefits to fish and aquatic habitats associated with roads in close proximity to streams than any other alternative. This alternative would provide less benefit to aquatic resources from improvements to hydrologic function than Alternative B, but more than Alternative A.

Effects of Alternative D

Under Alternative D, the Lewis and Clark TPA would have considerably fewer open roads (34 miles) compared to Alternative A (64 miles). Alternative D would have more open roads than Alternative B (28 miles) and Alternative C (20 miles).

In the context of watershed function, Alternative D would result in approximately 321 more acres in the low road density category, 1,002 more acres in the moderate road density category, and 1,324 fewer acres in the high road density category on BLM lands than Alternative A (Table 4-69). This alternative would have 140 fewer acres in the low road density category, 80 fewer acres in the moderate road density category, and 219 more acres in the high road density category than Alternative B. Under Alternative D there would be approximately 17 more miles of closed roads than under Alternative A, approximately 6 fewer miles of closed roads than under Alternative B, and approximately 21 fewer miles of closed roads than under Alternative C. Alternative D would lessen effects to fish habitat through improved watershed function more than Alternatives A and C, and to a similar degree as Alternative B. Alternative D would have fewer miles of closed road (2.1) and more miles of open road (5.3) within 300 feet of fish bearing streams on BLM lands than Alternatives B and C. Of the 5.3 miles of open roads, 3.2 miles would be adjacent to streams with special status species (westslope cutthroat trout and/or bull trout). Alternative D would reduce direct effects to fish bearing streams (including streams with special status species) more than Alternative A but less than Alternatives B and C.

Alternative D would contribute more indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than Alternatives B and C but less than Alternative A. Under Alternative D there would be 2.5 miles of closed road and 2.5 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. Alternative D would contribute fewer direct effects to aquatic habitats (fish bearing and non-fish bearing) from roads than Alternative A but more than Alternatives B and C.

Although Alternative D would contribute to improved fish habitat conditions from a hydrologic function standpoint to a similar degree as Alternative B, overall this alternative would have more adverse effects to fish and aquatic habitats than Alternatives B and C, but less than Alternative A.

Cumulative Effects on Fish

The Lewis and Clark TPA supports a variety of native and introduced fish species. One of the major human influences to fish in the TPA has been the introduction of non-native trout species including rainbow trout, brook trout, and brown trout throughout the TPA.

Rainbow trout have hybridized with the native westslope cutthroat trout in many streams. Brook trout and brown trout have displaced the native cutthroats in other streams, especially those altered by sedimentation and increased water temperatures brought on by human activities.

Due to their life history requirements, bull trout are more sensitive to increased water temperatures, poor water quality, and low flow conditions than many other salmonids. Past and continuing land management activities have degraded stream habitat, especially along larger river systems and stream areas located in valley bottoms, to the point where bull trout can no longer survive or reproduce successfully across their range. Brook trout easily hybridize with bull trout producing sterile offspring. Brook trout also reproduce earlier and at a higher rate than bull trout. Hybridization with brown trout may also be a problem in some areas of the TPA.

The majority of BLM managed routes for the Lewis and Clark TPA are located in and around the town of Marysville. The Marysville area is experiencing increased residential development, but to a lesser extent than the central Helena Valley area. The remaining BLM managed routes are located in three sub-planning areas: Stemple Pass, Sieben Ranch, and Lincoln. Bull trout are only found in the Blackfoot watershed that would be impacted by travel planning in the Lincoln Area.

Recreation use is well established in the TPA, especially for winter sports. Winter sport activities include: snowmobiling, downhill skiing (Great Divide Ski Area), backcountry skiing, ski racing, snowboarding, and snowshoeing. An extensive network of roads and trails support a wide range of off-season activities, including: camping, hunting, target practice, hiking, jogging, horseback riding, mountain bike riding, and motorized use.

Agricultural activities from farming and ranching contribute increases in nutrients, sedimentation, and loss of aquatic habitats through direct stream channel alterations. Many streams in the TPA have been impacted by historic and ongoing livestock grazing that breaks down streambanks, widens channels, removes vegetative cover and causes an increase in fine sediment and nutrients.

Since 1977, approximately 3,357 mining claims have been active throughout the Marysville area. Today 40 claims remain active, including the Bald Butte Mine, an open cut molybdenum mine. Increases in mineral prices could lead to increased or renewed mining activity. Many watersheds in the TPA have been degraded by historic mining activities.

Aquatic habitats have been affected by stream channel alteration and heavy metal contamination associated with historic mining and abandoned mine lands in some portions of this TPA. See the Water Resources section for this TPA for more details.

Fires, floods, and drought have historically affected fish habitat in the TPA. These disturbances can cause a pulse of sediment or may temporarily reduce the quality of fish habitat in some watersheds while leaving other streams largely unaffected. Population recovery in disturbed streams may be facilitated by fish immigration from nearby drainages less affected by the catastrophic event. Some natural disturbances may have short-term adverse effects but long-term beneficial effects to fish habitat such as increasing large wood recruitment to streams and floodplains. From 1981-2004 there have been 14 wildland fires that burned 83 acres. Seven of the fires were identified as human-caused and these fires burned the majority of the acres (75). Fuels reduction activities could occur around the town of Marysville in the future. Effects to fish habitat from these activities would likely be minimal.

Timber harvest can alter the recruitment of large woody debris, reduce canopy closures and result in an increase in fine sediment to streams. Timber harvest along with associated roads can contribute substantially to the overall cumulative effects in forested watersheds. Timber harvest has occurred on approximately 130 acres of BLM lands in the TPA over the last 23 years and there have been approximately 70 acres of timber salvage. Vegetative treatments on BLM lands have had minor effects to aquatic habitats in the TPA. However, timber harvest, salvage and past mining activities on private lands have altered the landscape and may have caused a decline in the quality and quantity of aquatic habitat in the TPA. Roads are another major contributor of sediment to streams and a major problem with regards to cumulative watershed effects. Roads and trails can have localized effects on nearby stream segments or at stream crossing sites, especially fords. Cumulatively, roads degrade aquatic habitat due to sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, loss of riparian vegetation, loss of large woody material and roads can cause changes in local fish populations when culverts are impassable and limit fish migration. Alternative A would have more negative cumulative effects to watersheds and individual streams due to roads than the action alternatives. Alternative B would have fewer negative cumulative effects than Alternatives A and D but more than Alternative C. Alternative B would improve overall watershed function as well as improve habitat in individual streams more than Alternatives A and D but less than C. Alternative C would have the greatest beneficial effects overall.

SPECIAL STATUS PLANTS

Effects Common to All Alternatives

Ground-disturbing activities from road construction and maintenance, as well as road use by vehicles can affect special status plant populations and habitat. These

activities can reduce sensitive plant species through disturbance to individual populations, increasing competition from invasive species, and reducing habitat connectivity. Closure of roads and trails can improve or maintain sensitive plant populations or habitat by reducing avenues of noxious weed spread, maintaining habitat connectivity, and improving pollinator habitat. Road and trail restrictions have the same effects but to a lesser degree.

Effects of the Alternatives

Under Alternative A, 57.5 miles of BLM roads and trails would remain open, 6.7 miles of roads and trails would be open with seasonal restrictions, and 3.4 miles of roads and trails would be closed. On the open roads, effects would continue as described in the Effects Common to All Alternatives section. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators.

Under Alternative B, 13.8 miles of BLM roads and trails would remain open, 14.3 miles of roads and trails would be open with seasonal restrictions, 26.8 miles of roads and trails would be closed, and 10.9 miles would be decommissioned. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Because more road miles would be closed under this alternative, Alternative B would benefit and reduce risk to special status plants more than Alternative A.

Under Alternative C, 8 miles of BLM roads and trails would remain open, 11.7 miles of roads and trails would be open with seasonal restrictions, 41.6 miles of roads and trails would be closed, and 5.2 miles would be decommissioned. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative C would benefit and reduce risk to special status plants more than any other alternative because it would eliminate disturbance, vehicular use, and spread of noxious weeds on the most road miles.

Under Alternative D, 19.6 miles of BLM roads and trails would remain open, 14.5 miles of roads and trails would be open with seasonal restrictions, 20.3 miles of roads and trails would be closed, and 8.8 miles would be decommissioned. On the open roads, effects would continue as described in the Effects Common to All Alternatives section. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative D would benefit and reduce risk to special status plants

more than Alternative A, but would pose more risk compared to Alternatives B and C.

Cumulative Effects on Special Status Plants

Under all alternatives there are a number of past, present, and reasonably foreseeable future actions that affect special status plant populations.

Livestock grazing will continue in the area and has the potential to impact sensitive plant populations and habitat. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain sensitive species populations and habitat. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, sensitive plants would benefit from the reduced competition. Use of herbicides for noxious weed control could cause mortality to special status plants if individual plants are inadvertently sprayed.

Recent and anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will reduce sensitive plant species habitat and in some cases individual populations. Additionally, subdivisions have the potential to disrupt the connectivity of plant habitat and populations as well as disturbing or eliminating pollinators needed by sensitive species. Some sensitive species that require soil disturbance may benefit.

Timber sale activity disturbance can destroy or degrade sensitive plant habitat. On public lands, projects would be designed to avoid, mitigate, or enhance sensitive plant habitats. The disturbance associated with timber harvest activities does have the potential to increase noxious weed spread which degrades sensitive species habitat and individual plant populations.

A molybdenum mine was started on private land above Bald Butte. The mine may expand on other private and public lands in the future. Impacts are not expected from this activity, because no sensitive plant species or habitat have been identified in the area at this time. A survey would be conducted prior to any disturbance on public land.

At the scale of the entire Lewis and Clark County NW TPA (all land ownerships), the BLM travel plan alternatives would have slightly variable contributions to cumulative effects on special status plants. Under Alternative A less than 1 percent of all roads in the TPA would be closed. Under Alternative B adverse effects on special status plants would be slightly reduced compared to Alternative A because 2.6 percent of all roads in the

TPA would be closed or decommissioned. Alternative C would provide the most benefits of all alternatives as 3.2 percent of all roads in the TPA would be closed or decommissioned. Alternative D would provide slightly more benefits than Alternative A but slightly fewer benefits than either Alternatives B or C as 2 percent of all roads in the TPA would be closed or decommissioned. Because BLM lands make up only 4.2 percent of all lands in the TPA, activities on non-BLM lands would play a greater role in determining the status of special status plants.

WILDLAND FIRE MANAGEMENT

Travel planning alternatives were analyzed to determine whether they could result in impact on wildland fire management, causing change to any of the following indicators:

- Fire regime condition class (FRCC)
- Firefighter and public safety
- Reducing threat to Wildland Urban Interface (WUI)

Effects Common to All Alternatives

Public road access during the fire season provides opportunities for human-caused fires either due to catalytic converters on vehicles igniting dry vegetation, or due to some types of human activities. Roads that are closed to public access reduce the risk of human-caused fire starts in those areas.

Decommissioned roads and roads that are closed and not regularly maintained for navigability reduce access for fire suppression. Closed roads may become impassible due to vegetation regrowth, downfall of trees, or severe erosion. Some roads may be closed with earthen berms or fallen trees and would need to be physically manipulated to make them useable for vehicles again. These roads would extend firefighting response time and have negative impacts on efforts to reduce wildland fire threat to WUI areas and firefighter and public safety. In an emergency fire suppression situation, any navigable closed roads needed for fire suppression would be used immediately. Non-navigable closed roads could also be used if deemed to be needed for fire suppression, after needed improvements are made to make those roads useable. Planning and implementation of fuels reduction treatments could occur in association with closed roads if variances for temporary road use were to be allowed. Variances would be subject to internal BLM review.

In the context of fuels reduction projects, availability of open roads is important to facilitating fuels project location as well as increasing project feasibility and decreasing costs. Open roads also facilitate spread of noxious weeds by transporting weed seed on vehicles and their tires. Presence of large noxious weed populations could delay or cause fuels projects to be

cost-prohibitive due to the fact that the weeds may have to be treated before and/or after the fuels treatment. Also, some applications of fuel treatments (e.g., prescribed fire) may promote the spread of some weeds. The presence of weeds and non-native species are indicators that FRCC has departed from historical conditions.

Noxious weeds and non-native invasive species are well established and spreading in the Lewis and Clark County NW TPA.

Effects of Alternative A

Under Alternative A, the majority of routes in the Lewis and Clark County NW TPA would be available for wheeled motorized use (57.5 miles open yearlong, 6.7 miles seasonally restricted), while 3.4 miles would continue to be closed. Alternative A would allow for the greatest flexibility between alternatives for access for suppression purposes. Fuels project feasibility would be highest under this alternative. However, public access during the fire season would be the greatest under this alternative and would provide the most opportunities for human-caused fire starts.

The distribution of noxious weeds could be the greatest in alternative A with the most open roads and noxious weeds already well established. This would contribute to reduced feasibility of fuels reduction projects more than under any other alternative.

Effects of Alternative B

Alternative B provides for separate use areas for wheeled motorized and non-motorized recreational opportunities. Under Alternative B, a total of 28.1 miles of routes would be available for motorized wheeled use (13.8 miles open yearlong, 14.3 miles seasonally restricted). The majority of routes located in the Stemple Pass and Lincoln areas would be closed, providing additional non-motorized opportunities. Alternative B would limit the flexibility for access for suppression purposes and fuels project feasibility would go down compared to Alternative A due to the fact that access would be limited to 28.1 miles of road. Of the 36.7 miles of closed roads, 10.9 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-cause fires associated with motorized use would be limited compared to Alternative A, due to a 49 percent decrease in miles of road open to motorized public travel compared to Alternative A.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would be closed under this alternative, Alternative B should help reduce the spread of noxious weeds and may make fuels treatments more feasible than under Alternative A, reducing FRCC departure.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized opportunities with 8 miles of routes open yearlong, and an additional 11.7 miles seasonally restricted.

Alternative C would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down compared to both Alternatives A and B, due to the fact that access would be limited to 19.7 miles of road. Of the 46.8 miles of closed roads, 5.2 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-caused fires associated with motorized use would be the lowest of all alternatives, due to a 64 percent decrease in miles of road open to public travel compared to Alternative A. However, this degree of reduced motorized access may promote more non motorized users to a concentrated area, increasing the chances for a human-caused fire to occur.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would closed than under any other alternative, Alternative C should help reduce the spread of noxious weeds more than any other alternative, and may make fuels treatment more feasible, reducing FRCC departure.

Effects of Alternative D

Under Alternative D, 19.6 miles of open routes would be available yearlong for wheeled motorized use and an additional 14.5 miles would be seasonally restricted routes. Of the 29.1 miles of closed roads, 8.8 miles would be decommissioned and would likely be unusable for fire suppression. Alternative D would be more flexible than Alternatives B and C but would limit flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A. The risk of human-caused fires associated with motorized vehicle use would be reduced compared to Alternative A, but would be greater than under Alternatives B and C, due to a 38 percent decrease in miles of road open to public travel compared to Alternative A.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because an intermediate number of road miles would be closed under this alternative, Alternative D should help reduce the spread of noxious weeds compared to Alternative A and may make fuels treatment more feasible, but would promote more weed spread and potentially make projects less feasible than Alternatives B and C.

Cumulative Effects on Wildland Fire Management

Effects on wildland fire management associated with any of the BLM travel plan alternatives would be overshadowed by reasonably foreseeable uncharacteristic fire, continued fire suppression made necessary by WUI and intermingled landownership, and large-scale forest insect infestations and disease outbreaks that would continue for the planning period. BLM lands make up about 4.2 percent of all lands while BLM roads make up about 4.7 percent of all roads in the Lewis and Clark County NW TPA.

Revision of the Helena National Forest Plan could result in more or less treatment of adjacent areas. Because no decision has been made, the effects are not known. Wildland fire management, particularly where wildland fire use (management of naturally ignited wildland fires to achieve resource objectives) may occur on USFS lands, will be determined in the plan decision. BLM would need to coordinate with USFS on all wildland fire use actions and events. Wildland fire use on USFS lands could affect FRCC on BLM lands. USFS lands make up 35 percent of all lands in the Lewis and Clark County NW TPA so activities there would likely have more influence on future fire characteristics than activities on BLM lands (4.2 percent of all lands in TPA).

Additionally, decisions to increase the level of wildland fire use, prescribed fire, or open burning by the public could impact the BLM's ability to use wildland fire and prescribed fire due to air quality concerns and requirements. This could postpone or eliminate BLM fuel reductions or treatments to improve FRCC.

Access is a critical component of wildland fire suppression. In some cases, access to public lands is being reduced by adjacent landowners gating or closing roads, which could hamper wildland fire suppression efforts and pose a risk to public and firefighter safety. Reducing access would also increase the potential for larger fires to occur due to an increase in time needed to access a fire and control it. Time needed to move in crews would be extended, and the ability to effectively apply and place resources (e.g., engines, water tenders, etc.) would be limited.

Effects on wildland fire management, including FRCC and firefighter and public safety due to management accomplished by other landowners may affect wildland fire management on public lands. When activity fuels (such as logging slash) are not treated adequately, fuel hazard could increase on adjacent lands which could affect fire intensity and severity on public lands. When adjacent owners treat fuels or implement fire mitigation plans in the WUI, fires are easier to suppress and firefighter safety is increased. In the Lewis and Clark County NW TPA, activities on private lands (53 percent of all lands in TPA) would have more influence on future fire characteristics in the area overall than

activities on BLM lands (4.2 percent of all lands in TPA).

Human population increases and subsequent residential development are likely to expand the WUI and could alter forest management, taking the emphasis off restoring historic composition and structure and focusing more on fuel reduction.

CULTURAL AND PALEONTOLOGICAL

Effects Common to All Alternatives

Alternative-specific risks or impacts to cultural and paleontological resources are difficult to discern due to a lack of extensive site-specific knowledge about the presence of these resources in a given TPA. By designating open routes, limiting open-country travel, and closing some routes, inadvertent discovery of cultural and paleontological resources and vandalism to them is reduced. Higher road densities in a given area would allow greater access to more land on the average, but that does not imply greater amounts of vandalism, since the vehicles would remain on designated routes.

VISUAL RESOURCES

Effects Common to All Alternatives

Roads (temporary or permanent) may affect visual quality. Roads that remain open for public use may impact visual qualities where noticeable. The quantity of open roads would also influence sensitivity levels since with more open roads, more areas would generally be viewed by more members of the public. Closing or decommissioning roads would generally reduce effects to visual resources and reduce sensitivity levels because fewer members of the public would generally be accessing and viewing areas with closed roads.

Effects of the Alternatives

Under Alternative A, there would be 64.2 miles of open road (including roads open with seasonal restrictions), and 3.4 miles of closed roads. This alternative would have the greatest impacts to visual resources of all alternatives.

Under Alternative B there would be 28.1 miles of open road (including roads open with seasonal restrictions), 26.8 miles of closed road, and 10.9 miles of decommissioned road. Road closures and decommissioning under this alternative would reduce effects on visual resources compared to Alternative A.

Under Alternative C there would be 19.7 miles of open road (including roads open with seasonal restrictions), 41.6 miles of closed road, and 5.2 miles of decommissioned roads. Alternative C would have fewer adverse effects and would improve visual resources the most of all alternatives.

Under Alternative D there would be 35.1 miles of open road (including roads open with seasonal restrictions), 20.3 miles of closed road, and 8.8 miles of decommissioned road. Alternative D would improve visual resources compared to Alternative A, but would have more adverse effects than Alternatives B and C.

Cumulative Effects on Visual Resources

Under all alternatives, most activities on BLM lands would generally not adversely affect visual resources to unacceptable degrees because discretionary activities on BLM lands would be required to meet Visual Resource Management objectives within individual project areas. The Bald Butte Mine will continue to impact visual resources for the foreseeable future as the mine expands on both private and public lands. The Great Divide Ski Area reduces visual quality in some portions of the Marysville area and will continue to do so for the foreseeable future.

Activities on non-BLM lands, particularly activities near BLM lands associated with residential development, urbanization, or vegetation management, could have adverse cumulative effects on visual resources on BLM lands because BLM VRM objectives would obviously not apply to non-BLM activities.

LIVESTOCK GRAZING

Effects Common to All Alternatives

Roads and trails can potentially affect livestock grazing management. Roads and trails often act as avenues of noxious weed spread. Noxious and invasive weeds can reduce the quantity and quality of forage for livestock. Users of roads and trails can cause management problems for livestock permittees when they leave gates open at fences, vandalize range improvements, or harass livestock either purposely or unintentionally.

Closure of roads and trails can improve or maintain the forage base by reducing vectors of noxious weed spread. Additionally, road and trail closures can reduce management conflicts. On the other hand, closures may increase permittees' time requirements if and when work has to be conducted with horses or afoot. Permittees could minimize effects of closed roads on grazing management time by seeking variances from the BLM for temporary use of specific closed roads.

Effects of the Alternatives

Under Alternative A, 64.2 miles of roads and trails would remain open during grazing season, and 3.4 miles of roads and trails would be closed. The effects would continue as described in the Effects Common to All Alternatives section. All action alternatives would close or decommission more roads and trails than Alternative A. As more roads and trails are closed, noxious and invasive weed spread along with multiple user conflicts would be reduced. On the other hand, permittee

management time may increase. Consequently, more effects as described under the Effects Common to All Alternatives section would occur under Alternative C (19.7 miles open during grazing season, 46.8 miles closed or decommissioned) than under any other alternative. Alternative B (28.1 miles open during grazing season, 37.7 miles closed or decommissioned) would produce fewer effects than Alternative C, but more than Alternative A or Alternative D (34.1 miles open during grazing season, 29.1 miles closed or decommissioned). Alternative D would have fewer effects than Alternatives B or C, but more than Alternative A.

Cumulative Effects on Livestock Grazing

A number of past, present, and reasonably foreseeable future actions affect livestock grazing at the scale of the entire Lewis and Clark County NW TPA. Livestock grazing will continue in the area and has the potential to impact forage quality and quantity. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain forage quality and quantity. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, forage conditions would benefit.

A molybdenum mine was started on private land above Bald Butte. The mine may expand on other private and public lands in the future. Some forage base may be reduced in the Drumlummon-Skelly and Empire Creek allotments.

Because BLM lands make up only 4.2 percent of all lands in the Lewis and Clark County NW TPA, all of the BLM travel plan alternatives would have a minimal contribution to cumulative effects on livestock grazing at the scale of the entire TPA.

MINERALS

Effects Common to All Alternatives

Road closures and decommissioning could affect access to locatable minerals in areas of moderate or high mineral potential. Operators would be required to seek travel variances from the BLM to use motor vehicles to conduct mineral exploration on closed roads, or to conduct exploration on seasonally restricted routes during the season of closure. Decommissioned roads could not be used for motorized exploration. Travel management provisions that require a permit or variance could result in reducing access to mining claims or interfere with the ability to conduct exploration work for some operators. Historic knowledge of mineralized areas

associated with “closed” roads may be lost after long periods of time if no exploration occurs there. Additional costs and time could be required for exploration and development of mining projects associated with closed or decommissioned roads. Impacts of road closures or decommissioning in areas with low mineral potential would not be substantial to mineral development.

Effects of the Alternatives

Effects of the alternatives for the Lewis and Clark County NW TPA on access to mineralized areas are summarized in **Table 4-75**. Alternative A would seasonally restrict access on 10 percent of the roads and would close an additional 5 percent of roads in high mineral potential areas; roads in moderate mineral potential areas would be left open.

Alternative B would seasonally restrict 17 percent of the roads, close 20 percent, and decommission 8 percent of the roads in high mineral potential areas. This same alternative would close 15 percent and decommission 8 percent of roads in the moderate mineral potential areas (**Table 4-75**). A total of 51 percent of the roads accessing mineralized areas in the Lewis and Clark County NW TPA would have either a seasonal restriction or closure on it under Alternative B.

Alternative C would close 33 percent and decommission 3 percent of the roads in high mineral potential areas. This same alternative would close 20 percent and decommission 5 percent of roads in areas with moderate mineral potential in this TPA (**Table 4-75**). A total of 61 percent of the roads accessing mineralized areas would be closed or decommissioned under Alternative C.

Alternative D would seasonally restrict 19 percent, close 17 percent, and decommission 6 percent of the roads in high mineral potential areas. This same alternative would seasonally restrict 3 percent, close 10 percent, and decommission 7 percent of roads in areas with moderate mineral potential. A total of 40 percent of the roads accessing mineralized areas would be either closed or decommissioned under Alternative D in the Lewis and Clark County NW TPA (**Table 4-75**).

Cumulative Effects on Access to Mineralized Areas

No other past, present, or reasonably foreseeable future actions in the Lewis and Clark County NW TPA would adversely affect mineral availability or access.

RECREATION

Effects of travel plan alternatives on Recreation in the Lewis and Clark County NW TPA are described qualitatively below.

Table 4-75 Analysis of Access to Mineral Potential Areas Lewis and Clark County NW TPA				
Mineral Potential	Open Miles (%)	Seasonally Restricted Miles (%)	Closed Miles (%)	Decom Miles (%)
Alternative A				
High	30.0 (44%)	6.7 (10%)	3.4 (5%)	0.0 (0%)
Moderate	19.6 (29%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Low	8.0 (12%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Total Miles = 67.6				
Alternative B				
High	9.7 (14%)	11.2 (17%)	13.5 (20%)	5.6 (8%)
Moderate	4.1 (6%)	0.2 (0%)	9.9 (15%)	5.3 (8%)
Low to none	0.0 (0%)	4.6 (7%)	3.4 (5%)	0.0 (0%)
Total Miles = 67.6				
Alternative C				
High	5.6 (8%)	9.9 (15%)	22.6 (33%)	1.9 (3%)
Moderate	2.4 (4%)	0.4 (0%)	13.5 (20%)	3.3 (5%)
Low to none	0.0 (0%)	2.5 (4%)	5.5 (8%)	0.0 (0%)
Total Miles = 67.6				
Alternative D				
High	12.5 (18%)	12.6 (19%)	11.2 (17%)	4.0 (6%)
Moderate	5.8 (8%)	2.0 (3%)	7.0 (10%)	4.8 (7%)
Low to none	1.3 (2%)	4.6 (7%)	2.0 (3%)	0.0 (0%)
Total Miles = 67.9 (Includes Proposed New Construction)				

Mineral Potential areas have been delineated by the Montana Bureau of Mines and Geology (MBMG)

Effects of Alternative A

Alternative A would provide more motorized opportunities than non-motorized opportunities. Under Alternative A, the majority of routes in the Lewis and Clark County NW TPA would be available for wheeled motorized use (57.5 miles open yearlong, 6.7 miles seasonally restricted). Area wide snowmobile (cross-country travel) use would be available on 16,997 acres. The Continental Divide Trail would continue to be managed for both motorized and non-motorized uses which would result in user conflicts.

Effects of Alternative B

Alternative B would provide for separate use areas for wheeled motorized and non-motorized recreational opportunities. Under Alternative B, a total of 28.1 miles of routes would be available for motorized wheeled use (13.8 miles open yearlong, 14.3 seasonally restricted). The majority of routes located in the Stemple Pass and Lincoln areas would be closed, providing additional non-motorized opportunities. Opportunities for cross-country snowmobile travel would be reduced with the area identified in the northwest portion of the TPA (Marysville area) being restricted to designated routes only, during the season of use (12/2-5/15), conditions permitting. Winter use conflicts would be reduced under Alternative B, as cross-country skiers could use the area in the upper northwest portion of the Marysville area for non-motorized use as well as the Great Divide Ski Area.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized opportunities: 8.0 miles of routes managed open yearlong, and 11.7 miles managed as seasonally restricted. Closure of the routes located in the northwest corner of the Marysville area would result in an enhancement of non-motorized opportunities. Opportunities for cross-country snowmobile travel would be eliminated. Snowmobiles would be restricted to designated routes only during the season of use (12/2-5/15), snow conditions permitting.

Effects of Alternative D

Alternative D would provide the highest level of wheeled motorized access of the action alternatives. Under this alternative, a total of 34.1 miles of routes (19.6 miles open yearlong, 14.5 miles seasonally restricted) would be available for motorized use. Opportunities for ATV riders and hunters would be enhanced through the addition of a yearlong ATV-Only route and a game retrieval route. Motorized users would also have more opportunities in the Lincoln and Stemple Pass areas. Cross-country snowmobile travel would be allowed throughout the TPA with 2 exceptions, the Great Divide Ski area and the northwest portion of the TPA. Travel in these areas would be restricted to existing routes only during the season of use (12/2-5/15),

providing some dispersed recreation opportunities for non-motorized users.

Cumulative Effects on Recreation

Alternative A would provide the greatest opportunities for motorized uses especially in the Marysville area. Given the population growth trends in the nearby Helena Valley it is expected that visitation levels on BLM lands in the Marysville area will increase along with conflicts between non-motorized and motorized users, especially during the big game hunting season. In addition, potential impacts to the natural settings within this area are expected to increase given increasing mineral values, vegetative treatments, road improvements, noxious weed spread, residential home building, prescribed fires and additional rights-of-way requests for access. Under this alternative no Recreation Opportunity Spectrum designations would be made to guide discretionary developments and impacts to non-motorized users would be most likely to increase at the greatest rate.

Under Alternative B about 55 percent of the BLM roads within the TPA would be closed. This action coupled with other existing and potential actions would enhance non-motorized Recreation Opportunity Spectrum settings and user opportunities, reduce conflicts between non-motorized and motorized users, and promote more retention of big-game species on BLM thus improving walk-in hunting opportunities. Designating Recreation Opportunity Spectrum settings would help to ensure that varied opportunities are provided throughout the TPA and that expected experiences are provided to the public.

Alternative C would impose the greatest impacts on motorized travel opportunities while opportunities for non-motorized experiences would be the most benefited. Recreation Opportunity Spectrum management and big game hunting opportunities within the TPA would be similar to Alternative B with the exception that no motorized routes would be open in the northwest extremity of the Marysville area and thus a Semi-Primitive Non-motorized setting would be a management objective.

Under Alternative D, cumulative effects of the travel management actions coupled with all other existing and reasonably foreseeable actions would be similar to Alternative A with the exception that fewer roads would be open to public use.

TRAVEL MANAGEMENT AND ACCESS

Effects of Alternative A

Most roads in the Lewis and Clark County NW TPA would continue to be managed as open yearlong (57.5 miles) (Table-4-76). This would be about 66 percent more routes open yearlong than under the action alternatives. When considering both open routes and routes with seasonal restrictions, 47 percent more routes would be open to motorized use than under the action

Table-4-76 Lewis & Clark TPA Route Management Summary				
Proposed Management	Total Miles			
	Alt A	Alt B	Alt C	Alt D
Wheeled motorized routes				
Open Yearlong	57.5	13.8	8.0	19.6
Seasonally Restricted	6.7	14.3	11.7	14.5
Closed	3.4	26.8	41.6	20.3
Decommissioned	0	10.9	5.2	8.8
Non-motorized trails ¹	5.27	37.7	46.7	29.1
¹ Non-motorized trails include all existing trails, closed roads, and decommissioned roads.				

alternatives. Non-motorized users would have a lower quality recreation experience compared to under the action alternatives.

Alternative A would allow the greatest snowmobile use of all alternatives, with area-wide cross-country use available on 16,997 acres. Outside the Great Divide Ski Area, cross-country snowmobile access would be allowed on approximately 25 percent more acres than under any of the action alternatives. Separate use areas for non-motorized winter sports enthusiasts would be less under Alternative A.

User conflicts would be evident during the winter in the Lewis and Clark County NW TPA since cross-country snowmobile use would be allowed in all areas (except the Great Divide Ski Area), leaving no areas for dispersed cross-country ski opportunities.

The Continental Divide Trail would continue to be managed for both motorized and non-motorized uses which would result in user conflicts.

The extent of management activities and costs under Alternative A would be mixed. Less personnel time would be required to monitor travel compliance than under the action alternatives. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards) than under the action alternatives. Estimated costs for road/trail maintenance would be highest of all alternatives.

The need for BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be minimal under this alternative, given the availability of motorized access.

Effects Common to Action Alternatives

Re-routing the motorized portion of the Continental Divide Trail in the Lewis and Clark County NW TPA would enhance non-motorized opportunities and remove motorized conflicts.

Effects of Alternative B

Under Alternative B, the Lewis and Clark County NW TPA would provide four times fewer routes open yearlong to motorized access than under Alternative A (Table-4-76). Opportunities for motorized users would be less under Alternative B, than under Alternative A.

With 37.7 miles of non-motorized trails, there would be more opportunities for non-motorized users than under Alternative A. Closing most of the routes located in the Stemple Pass and Lincoln areas would provide additional non-motorized opportunities in these areas.

Compared to Alternative A, opportunities for cross-country snowmobile travel would be reduced with the area identified in the northwest portion of the TPA (Marysville area) restricted to designated routes only, during the season of use (12/2-5/15), conditions permitting.

Dispersed recreational opportunities would be created that allow motorized and non-motorized users to recreate separately. Winter use conflicts would also be reduced under Alternative B compared to Alternatives A and D, as cross-country skiers could use the area in the upper northwest portion of the Marysville area for non-motorized use as well as the Great Divide Ski Area.

The extent of management activities and costs under Alternative B would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards) than under Alternative A. However, more effort would be required for public education and compliance than under Alternative A. Estimated costs for road/trail maintenance would be less than under Alternative A.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would increase under Alternative B compared to Alternative A.

Effects of Alternative C

Alternative C would provide the least amount of wheeled motorized access in the Lewis and Clark County NW TPA of all the alternatives (19.7 miles) (Table-4-76) and therefore, fewer opportunities for motorized users would be available. Alternative C would provide 70 percent fewer motorized miles than Alternative A, and 30 percent fewer than Alternative B. Closure of routes in the northwest corner of the Marysville area under Alternative C would result in an enhancement of non-motorized opportunities in that area.

Closure and decommissioning of routes in the Lewis and Clark County NW TPA would result in an increase in non-motorized opportunities. Alternative C would have 43 percent more miles of non-motorized trails than Alternative A, and 19 percent more than Alternative B.

Opportunities for cross-country snowmobile travel would be eliminated. Snowmobiles would be restricted to designated routes only during the season of use (12/2-5/15), snow conditions permitting. Non-motorized winter sports opportunities would increase because of the restrictions.

The extent of management activities and costs under Alternative C would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards) than under any other alternative. However, more effort would be required for public education and compliance than under the other alternatives. Estimated costs for road/trail maintenance would be the lowest of the alternatives.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be the greatest under Alternative C than under any of the other alternatives.

Effects of Alternative D

Alternative D would have 34.1 miles of motorized routes (open and seasonally restricted) (**Table-4-76**) and would provide more motorized access than any of the other action alternatives. Motorized access under Alternative D would be about 47 percent less than under Alternative A, but 18 and 42 percent more than under Alternatives B and C, respectively.

Opportunities for ATV riders and hunters would be enhanced above all other alternatives through the addition of a yearlong ATV-Only route and a game retrieval route, respectively. Motorized users would also have more opportunities under Alternative D in the Lincoln and Stemple Pass area than under Alternatives B or C.

Allowing snowmobile access on closed routes would result in an increase in motorized winter opportunities compared to Alternatives B and C; however, cross-country snowmobile travel would be restricted to existing routes in the northwest portion of the TPA and Great Divide Ski Area during the season of use (12/2-5/15), similar to Alternative B. Snowmobile management would result in fewer dispersed opportunities for non-motorized winter user compared to Alternative C.

Restricting snowmobile access in the northwest portion of the TPA and Great Divide Ski Area would provide dispersed recreation opportunities and result in a decrease in winter use conflicts. These effects would be similar under Alternatives D and B, greater than under Alternative A, but less under Alternatives C.

The extent of management activities and costs under Alternative D would be mixed. Less personnel time would be required to monitor travel compliance than under Alternatives B and C, but more would be needed than under Alternative A. However, more effort would be required for initial implementation (signing

designated routes, installing bulletin boards) than under the other action alternatives. Estimated costs for road/trail maintenance would be higher than under the other action alternatives, but less than under Alternative A.

Cumulative Effects on Travel Management and Access

Under all alternatives, there are a number of past, present, and reasonably foreseeable BLM and non-BLM actions and activities affecting travel management and access in the Lewis and Clark County NW TPA.

The majority of BLM-managed routes in the Lewis and Clark Northwest travel planning area is located in and around the town of Marysville, located approximately 25 miles northwest of Helena. Much of the use in the Marysville area (especially winter use) comes from Helena Valley residents. The Helena Valley has been experiencing steady population growth. This trend is expected to continue, along with increased recreational use of this travel planning area. These factors could lead to increased public pressure to accommodate either more, or less motorized use.

The remaining BLM managed routes are located in 3 sub-planning areas: Stemple Pass, Sieben Ranch, and Lincoln (west of the small town of Lincoln, Montana). There is some residential development adjacent to the Lincoln sub-planning area that could influence travel management as well.

The Marysville area is experiencing increased residential development, but to a lesser extent than the central Helena Valley area. Urbanization and increased recreational use may lead to increased social conflict; between area residents and recreation users, and among recreational users themselves (motorized/non-motorized). As a result, there may be increased public demands to alter the existing travel management to accommodate either more, or less motorized use.

Recreation use is well established in the TPA, especially for winter sports. Winter sport activities include: snowmobiling, downhill skiing, backcountry skiing, ski racing, snowboarding, and snowshoeing. An extensive network of roads and trails support a wide range of off-season activities, including: camping, hunting, target practice, hiking, jogging, horseback riding, mountain bike riding, and motorized use (motorcyclists, OHV riders, and 4-wheel drive enthusiasts). As recreation use grows, conflicts between non-motorized and motorized recreation users could lead to increased public demands for either more, or less motorized use.

The TPA (all land ownerships) includes a number of wildlife and aquatics/fisheries concerns. The western half of the TPA is a wildlife movement corridor between the Northern Continental Divide Ecosystem and the Greater Yellowstone Ecosystem, portions of the TPA are in the occupied range of grizzly bear range, the entire

TPA is within the Northwest Montana Recovery Area for the gray wolf. Mule deer winter range is located along the eastern half of the TPA (158,140 acres) as well as near Lincoln (21,500 acres). Elk winter range is also located in the lower elevations along the eastern half of the TPA (193,800 acres) as well as around Lincoln (55,500 acres). Approximately 112,250 acres of cool, moist forest in the TPA provide habitat for the Canada lynx. Two BLM sensitive amphibians have been found within the Lewis and Clark County NW TPA, the boreal toad and the Northern leopard frog. Another BLM sensitive species, the wolverine, has also been documented west of the Continental Divide in the TPA. Over 66 fish-bearing streams are located in the Lewis and Clark County NW TPA with 61 providing habitat for westslope cutthroat trout, as well as for river otter, beaver, and moose. Concerns could lead to demands to restrict motorized use.

The TPA contains a 3 mile long section of the Continental Divide Trail (road) that is currently shared by motorized vehicles and hikers. Rerouting the trail off this road would reduce use conflicts between motorized and non-motorized users.

In some site specific cases, visual resource management may effect or restrict new road construction.

Continuing residential development may lead to an increase in right-of-way permits to accommodate private property/development access. As a result, public access to BLM lands, via these rights-of-way, could increase as well.

Limits or reductions in the BLM's funding and ability to maintain designated routes could lead to an overall reduction of maintained motorized routes.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuels reduction projects, could affect travel management. BLM forest management activities from 1984 to present include 48 acres of forest planting, 66 acres of timber salvage, and 132 acres of timber harvest. Future activities may include approximately 1,200 acres of forest and woodland treatment (thinning, selective harvest), although no planning is underway on these activities. Wildland fire management activities may include a future 1,500-3,000 acre mechanical and/or prescribed fire treatment for the Marysville area, focused on the urban interface areas. Depending on the type and scope of project, effects could vary from temporary, short-term area/route closures, to new opportunities (new routes) for motorized or non-motorized access.

Historical information indicates that since 1977, 3,357 claims have been active throughout the Marysville area. Today only 40 claims remain active, including the Bald Butte Mine, an open cut molybdenum mine. Increases in other mineral prices could lead to additional increased or renewed mining activity. Depending on the type and scope of mining activity, effects could vary from

temporary, short-term area/route closures, to increased opportunities (new routes) for motorized or non-motorized access.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Motorized activities play a large role in the distribution of noxious weeds. Concerns over the spread of noxious weeds could influence travel management, and lead to fewer motorized opportunities.

Motorized use on dirt roads and trails is a major contributor to soil erosion and stream sedimentation. These concerns may influence travel management, and result in fewer motorized opportunities.

Most illegal activities (trash dumping, drug use, underage alcohol use, unattended camp fires, vandalism, etc.) are directly associated with motorized use. At present, illegal activities in this TPA pose less of an issue than for the Helena and East Helena TPAs. However, increased future motorized use activity is likely to lead to increased illegal activity, and could lead to fewer motorized opportunities.

For perspective, BLM managed lands represent approximately 4.2 percent of the total travel planning area (406,700 total acres, 17,037 BLM acres); while BLM managed routes represent approximately 4.7 percent of the total routes available (1,447.7 total miles, 67.6 miles BLM roads/trails). Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use).

As a result, BLM routes available to motorized use (especially in the Marysville area) could experience increased use from displaced users, leading to more concentrated use, increased resource impacts, user conflicts, and pressure to reduce or increase motorized use.

Under Alternative A, overall increases in human population, urbanization, recreation use, user conflicts; and concerns for wildlife, fisheries, noxious weed spread, soil erosion/water quality, and illegal activities are likely to lead to increased demands to restrict motorized travel. Under Alternative B, these pressures would have less impact on travel management than under Alternatives A and D, due to the overall reduction in motorized opportunities and separation of motorized and non-motorized uses. Under Alternative C, these pressures would have the least impact on travel management than under the other alternatives, due to the reduction in motorized opportunities. Under Alternative D, these pressures may lead to increased demands to restrict motorized travel.

TRANSPORTATION FACILITIES

For the sake of this discussion, "open" roads include roads that are open yearlong as well as those that are open with seasonal restrictions.

Effects of Alternative A

Under Alternative A, the Lewis and Clark County NW TPA would have 64.2 miles of open roads and no motorized trails (Table 4-77). Estimated costs for annual maintenance and stabilization of roads under Alternative A would be much greater than under any of the action alternatives because of the highest level of open roads. Estimated annual costs for monitoring and compliance, and weed control would be higher for Alternative A than under the action alternatives.

Table 4-77 Lewis & Clark County NW TPA Route/Trail/Maintenance Costs				
Classification/Cost	Alt A	Alt B	Alt C	Alt D
Miles of Open/ Restricted Roads	64.2	28.1	19.7	34.1
Motorized Trails	0	0	0	2.2
Annual Roads Maintenance	\$5,136	\$2,248	\$1,576	\$2,728
Annual Trails Maintenance	\$0	\$0	\$0	\$147
Periodic Road Stabilization	\$2,054	\$899	\$630	\$1,091
Periodic Trails Stabilization	\$0	\$0	\$0	\$29
Monitoring/ Compliance	\$3,210	\$1,405	\$985	\$1,705
Weed Control	\$963	\$422	\$296	\$512

Effects of Alternative B

Under Alternative B, the Lewis and Clark County NW TPA would have 28.1 miles of open roads and no motorized trails (Table 4-77).

Estimated costs for annual maintenance and stabilization of roads under Alternative B would be similar but

slightly lower than under Alternative D, less than under Alternative A and more than under Alternative C. Estimated annual costs for monitoring, compliance, and weed control would also be less than under Alternative A, more than under Alternative C, and similar but slightly less than under Alternative D.

Closing the upper northwest portion of the Marysville area to motorized vehicles and to cross-country snowmobile travel would result in a slight increase in transportation facility costs for additional signage and sign maintenance.

Effects of Alternative C

Under Alternative C, the Lewis and Clark County NW TPA would have 19.7 miles of open roads and no motorized trails (Table 4-77). Estimated costs for annual

maintenance and stabilization of roads under Alternative C would be the least of all the alternatives due to the least number of motorized routes. Estimated annual costs for monitoring, compliance and weed control would also be less than under the other alternatives.

Closing the entire northwest portion of the Marysville area to motorized vehicles and to cross-country snowmobile travel would result in a slight increase in transportation facility costs for additional signage and sign maintenance.

Effects of Alternative D

Under Alternative D, the Lewis and Clark County NW TPA would have 34.1 miles of open roads and one motorized trail (Table 4-77). Estimated costs for annual maintenance and periodic stabilization of roads under Alternative D would be greater than under Alternatives B and C, but less than under Alternative A. Alternative D is the only alternative with a motorized trail that would receive annual and periodic stabilization. Estimated annual costs for monitoring, compliance, and weed control would be less under Alternative D than under Alternative A and more than under Alternatives B and C.

The addition of several routes in the Marysville area including an ATV-Only route and a game retrieval route would result in an increase in transportation facility costs due to new signage and sign maintenance.

Closing the northwest portion of the Marysville area to cross-country snowmobile travel would also result in an increase in transportation facility costs for additional signage and sign maintenance.

LANDS AND REALTY

Effects Common to All Alternatives

The Butte Field Office administers approximately 96 rights-of-way (ROW), 1 non-commercial occupancy lease, and 2 commercial occupancy leases within the boundaries of the Lewis and Clark TPA, which encumber approximately 1,961 acres of BLM land (Table 4-78). Various types of road rights-of-way are the most common type of grant, accounting for 46 percent, or just under half of the total. Other types of authorized uses include: oil and gas pipelines, lines for electrical distribution and telephone facilities, communication sites, ditches, railroads, and mineral material sites.

Approximately four right-of-way applications for new facilities as well as amendments, assignments, renewals, or relinquishments of existing right-of-way grants are processed annually in the TPA. This would not vary by alternative.

Table 4-78 Lewis and Clark TPA ROWs/Leases		
Type	Approximate Number	Approximate Acres
Roads	44	558
Power	17	101
Telephone	12	21
O&G Pipelines	4	59
Comm Sites	8	4
2920 Leases	3	1,050
Other	11	168
Totals	99	1,961

The general trend of granting rights-of-way is expected to increase through the planning period as a result of increasing public demands. From a cumulative effects standpoint, development of adjacent federal, state and private land, increased recreational use and the trend of homeownership away from urban areas, coupled with traditional on-going uses, are all expected to require more guaranteed access involving public land, including BLM lands.

SPECIAL DESIGNATIONS

Effects of the Alternatives

BLM currently manages a three-mile segment of the Continental Divide Scenic Trail in cooperation with the Forest Service in this TPA. This trail segment is subject to increasing impacts from numerous resource uses including motorized travel, rights-of ways, private home developments, and grazing improvements. Under Alternative A, current travel management direction is not providing protection of the trail corridor and user experience levels are impacted by conflicting intrusions. The Continental Divide Trail would continue to be managed for both motorized and non-motorized uses which would result in continued user conflicts.

Under Alternative B, travel management prescriptions would not remove motorized conflicts on the Continental Divide Scenic Trails as the trail would continue to follow an open motorized travel route. Under this alternative, alternate trail routes would be evaluated with the Forest Service to minimize conflicts, enhance hiker experiences, reduce human intrusions, and decrease the need for easement acquisitions.

Under Alternative C, effects would be similar to Alternative B although some additional secondary roads in close proximity to the Continental Divide Scenic Trails would be closed.

Under Alternative D, effects on the Continental Divide Trail would be similar to Alternative B although more intersecting secondary roads would remain open to

public use and therefore motorized use conflicts would be slightly higher.

Cumulative Effects on Special Designations

No other past, present, or reasonably foreseeable future actions in the Lewis and Clark County NW TPA would adversely affect Special Designations.

BOULDER/JEFFERSON CITY TPA

The 60,418-acre Boulder/Jefferson City TPA contains approximately 14,487 acres of BLM lands. There are approximately 61 miles of BLM roads, making up about 15.6 percent of the approximate total of 392 road miles in the TPA. The majority of roads (212 miles) lie on private lands.

SOILS

Effects Common to All Alternatives

Road construction, use, and maintenance affect soils in a number of ways. Soils are often compacted by these activities. Soil compaction can lessen the amount of precipitation that can infiltrate into soil and increase runoff, erosion, and sedimentation – in turn decreasing soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.

Ground disturbance associated with road construction, use, and maintenance can result in erosion. Erosion affects soil/site stability and hydrologic function. Erosion and sedimentation can destabilize the surface and subsurface cohesion of the soil, resulting in soil loss from erosion sites. Loss of soil can impede or prevent establishment and development of vegetation communities.

Closing or decommissioning roads often leads to beneficial effects to soils through decreased site disturbance and re-establishment of vegetative cover on road surfaces. This tends to reduce soil erosion and stabilize soils. Decommissioning roads may in some cases entail ripping road surfaces to de-compact them, thus improving water infiltration, hydrologic function, and the ability of the treated area to revegetate more successfully.

Impacts to soils associated with site-specific travel plan alternatives were assessed based on the potential for soil erosion using the following erosion risk criteria:

- High – the area a route travels through has slopes greater than 30 percent gradient.
- Moderate – the area a route travels through has slopes ranging from 15 to 30 percent gradient; or, for granitic soils, slopes ranging from 0 to 30 percent gradient.

- Low – the area a route travels through has slopes ranging from 0 to 15 percent gradient and soils are not granitic in origin.
- Unrated – road mapping not available at time of erosion impact rating.

Effects of the Alternatives

The distribution of road miles by erosion risk category and by proposed road management category for all alternatives is shown for the Boulder/Jefferson City TPA in **Table 4-79**. Roads in the “unrated” category were excluded from detailed consideration and are shown for the purpose of displaying the extent of lacking information.

The table shows that under current conditions (Alternative A) approximately 27.7 miles of BLM roads are located in areas with high erosion risk, and 23.1 miles are in moderate erosion areas. Soil erosion would be reduced under Alternative B because this alternative would reduce those mileages to 13.7 miles and 12 miles, respectively. Approximately 23.2 miles of road in the high and moderate classes would be closed under Alternative B. This should allow soil stabilization and/or vegetative recovery on these areas and further reduce soil erosion.

Soil erosion from roads would be reduced more under Alternative C than under any other alternative because the lowest mileage of roads in the high and moderate erosion risk categories would be left open (21.1 miles combined), while the greatest mileage in these categories would be closed (27.5 miles) of all alternatives.

Soil erosion associated with roads would be reduced under Alternative D compared to Alternative A, but would still be higher than under either Alternative B or

C. This is because 34.9 miles of road in the moderate and high erosion risk categories combined would be open under Alternative D, while only about 11.8 miles in these categories would be closed under this alternative.

Cumulative Effects on Soils

Cumulative effects to soils in the Boulder/Jefferson City TPA would arise from many past, present, and foreseeable future actions on BLM lands as well as non-BLM lands. Within this 60,418-acre TPA, BLM lands make up 14,487 acres or 24 percent of lands. The approximately 60 miles of BLM roads make up about 15 percent of the approximately 392 road miles in the entire TPA. Therefore road-related effects to soils described by alternative above would affect about 15 percent of all roads in the TPA. Remaining roads are managed by Jefferson County, the Forest Service, state, and private landowners.

Reclamation of abandoned mine lands has contributed to improved revegetation and subsequent stabilization of soils at a number of locations throughout this TPA. Riparian areas along about 3.7 miles of High Ore Creek underwent removal of contaminated tailings and waste rock and subsequent revegetation in 1999-2000. Riparian areas along Big Limber Gulch (tributary to Cataract Creek) and Spring Creek (tributary to Prickly Pear Creek in Upper Missouri River watershed) have also undergone recent reclamation and revegetation work that has improved soil stability and reduced erosion.

Ongoing ground disturbing activity associated with mining for lead, zinc, gold, and silver from an open pit mine (Montana Tunnels Mine) near Jefferson City is likely to continue through approximately 2008. The permitted mine area is approximately 1,500 acres in size with 130 of those acres on BLM land. Varying degrees

Table 4-79

BLM Road Miles in Soil Erosion Impact Categories by Alternative for the Boulder/Jefferson City TPA
(mileages are GIS-generated estimates)

Proposed Road Management	Erosion Risk Category	Alternative A	Alternative B	Alternative C	Alternative D
Open Road Miles (incl. Open w/restrictions)	High	27.7	13.7	11.9	19.9
	Moderate	23.1	12.0	9.2	15.0
	Low	0.3	0.6	0.6	0.6
	Unrated	8.7	0.8	1.0	2.4
Closed Road Miles	High	0	12.6	14.3	6.3
	Moderate	0	10.6	13.2	5.5
	Low	0	0.7	0.7	0.7
	Unrated	0	7.1	6.7	7.3
Decommissioned Road Miles	High	0	1.4	1.4	1.4
	Moderate	0	0.6	0.6	0.6
	Low	0	0	0	0
	Unrated	0	0.7	0.7	0.7

Note: Open roads include seasonally open roads as well as roads open yearlong.

of soil stability exist at the site with some removal of topsoil, erosion, and compaction mixed with undisturbed, vegetated areas within the permitted boundary.

Approximately 2,051 acres of BLM lands are permitted for various rights-of-way and leases. Approximately 1,256 of these acres are for road rights-of-way. The remaining 795 acres are associated with power lines, communication sites, and other utility facilities. Impacts to soils range from compaction and occupation of ground with buildings and facilities to revegetation and ground cover being re-established to stabilize soils. Of this total area, approximately 682 acres are associated with power lines and have substantial vegetative ground cover over much of the ground to stabilize soils.

Selective timber harvest has occurred on approximately 259 acres of BLM lands in the TPA from 1984 to 1995. From 1995 to the present timber harvest occurred on 7 BLM acres while post-wildland fire timber salvage occurred on about 559 BLM acres as well as an unknown amount of private land. These activities have generally had relatively minor adverse effects on soils causing some localized erosion and compaction but generally allowing for revegetation post-timber harvest. Timber harvest has also occurred on private and Forest Service lands, will likely continue, and will have localized impacts on soils for the foreseeable future.

In 2000, a wildland fire burned approximately 10,800 acres in this TPA, approximately 4,670 of which were BLM lands. The fire burned with variable severity creating a mosaic of effects to soils. More severely burned areas underwent more severe erosion than areas burned less severely. Fire rehabilitation activities such as reseeding with grasses/herbaceous species, waterbarring of firelines, and post-fire noxious weed treatments helped minimize soil loss due to post-fire erosion. Tree planting on approximately 690 BLM acres of this burned area have contributed to longer term soil stabilization.

Deliberate fuels treatments conducted on private and Forest Service lands will also likely occur for the foreseeable future with variable effects to soils. Reducing fuels under the controlled conditions of deliberate treatments may benefit soils in the long-term by reducing the risk of high severity fires in treated areas.

Livestock grazing on public and private lands throughout much of the TPA has created areas of localized soil erosion and compaction throughout the TPA. This will continue to occur for the foreseeable future.

Increasing residential development will likely continue for the foreseeable future. Erosion, compaction, and covering of soils would occur due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments.

Under Alternative A, the contribution to cumulative effects on soils from BLM road management would continue as it occurs today. Retaining approximately 60 miles of road open yearlong would allow for the same level of compaction and erosion impacts that currently exist.

From a BLM road management perspective, all action alternatives would benefit soil resources compared to Alternative A. Alternative B would provide for a reduced contribution to adverse cumulative effects on soils than would Alternative A because about 55 percent of BLM roads would be closed or decommissioned under Alternative B. Of the remaining approximately 27 miles of open road, most of them (about 23 miles) would be seasonally restricted to exclude motorized vehicle use between 12/2 to 5/15 each year. This would prevent motorized use during the wet spring snowmelt/runoff period and would therefore reduce erosion from BLM roads.

Alternative C would provide for the least contribution to adverse cumulative effects on soils of all alternatives. This alternative would provide for closure or decommissioning of about 62 percent of BLM roads in the TPA, thus allowing these areas to vegetatively recover and stabilize soils. The majority of open roads under this alternative (approximately 20 out of 23 miles) would be seasonally restricted to exclude motorized use between 12/2 to 5/15 each year. As with Alternative B, this seasonal closure would prevent motorized use during the wet spring snowmelt/runoff period and would therefore reduce soil erosion.

Alternative D would provide for the greatest contribution to adverse cumulative effects on soils of the action alternatives, but would still provide for greater long-term benefits to soils than Alternative A. Alternative D would provide for closure or decommissioning (and therefore vegetative recovery and soil stabilization) of about 40 percent of BLM roads in the TPA. As with Alternatives B and C, the majority of open BLM roads (about 33 out of 38 miles) would be seasonally restricted to exclude motorized use between 12/2 to 5/15 each year. This would allow for the same types of beneficial effects to soils described above for Alternatives B and C.

Due to the scattered distribution and relatively small proportion of BLM lands (24 percent) and roads (15 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on soils at the scale of the Boulder/Jefferson City TPA.

WATER RESOURCES

Effects Common to All Alternatives

There are a number of key concepts that are critical to understanding road effects to water resources.

Hydrologic function is an interaction between soil, water, and vegetation and reflects the capacity of a site to:

- Capture, store, and safely release water from rainfall, runoff, and snowmelt;
- Resist a reduction in this capacity; and
- Recover this capacity following degradation.

Interception of precipitation results when precipitation falls on vegetation. When vegetation is removed, precipitation falls directly on the soil. This can increase surface erosion and sedimentation, and decrease the amount of time between initial precipitation arrival and peak surface runoff – in turn decreasing soil/site stability and hydrologic function. Roads remove vegetation and therefore decrease interception of precipitation.

Infiltration is the process of precipitation entering and traveling through soil. Infiltration reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. Infiltration also filters precipitation and reduces erosion and sedimentation. If infiltration is reduced, runoff and erosion will increase and hydrologic function will decrease. Generally, roads are compacted surfaces that have decreased infiltration, thus increasing runoff and potentially increasing erosion.

Runoff can affect the amount of erosion and sedimentation, as well as flooding – both onsite and offsite. If runoff is increased, all of these effects can increase with a result that water quality and hydrologic function will decrease.

Increased sediment entering waterbodies increases turbidity, increases width-to-depth ratios, and consequently increases temperature and dissolved oxygen saturation levels, and creates adverse habitat for aquatic animals and plants.

Alteration of flow routing can also affect water resources. For example, roadcuts into areas with relatively shallow groundwater can intercept groundwater, bring it to the surface, and transport it some distance (i.e. in a roadside ditch) before delivering it to a stream. This can lead to erosion of road ditchlines and subsequent sedimentation of streams during runoff periods, or increased thermal loading of water before delivery to a stream during summer periods.

Closure and decommissioning of roads tend to reduce erosion and sedimentation effects stemming from roads on water quality. On an equivalent road mile basis, decommissioning roads would benefit water quality to a greater degree than closing roads because the decommissioning process would often entail implementing measures to restore hydrologic function. During road decommissioning items such as compaction, drainage, stream crossing culverts, and ground cover are often addressed in a manner that

markedly improves hydrologic function. These features are not fully addressed on roads that are merely “closed”. However, the reduced disturbance on newly closed roads combined with the tendency for revegetation to re-establish ground cover on them would reduce erosion and subsequent sedimentation effects to water quality.

Effects of the Alternatives

Generally, road density is an indicator of overall watershed health and function. Watersheds with higher road densities tend to have lower water quality due to greater disruption of hydrologic function (described above), and potential for erosion and subsequent sedimentation. Road density also is related to the distribution and spread of noxious weeds. **Table 4-80** shows acres of BLM land in three road density categories by alternative for the Boulder/Jefferson City TPA. These data reflect any differences between alternatives based on roads proposed for “decommissioning” by alternative. While many “closed” roads would gradually contribute to increased hydrologic function over time, decommissioned roads would more directly contribute to hydrologic function because measures aimed at restoring hydrologic function would likely be part of the treatment during decommissioning.

Table 4-80			
Acres of BLM Land in Road Density Categories by Alternative for the Boulder/Jefferson City TPA			
TPA Alternative	Road Density Category		
	Low ($< 1 \text{ mi/mi}^2$)	Moderate ($1 \text{ to } 2 \text{ mi/mi}^2$)	High ($> 2 \text{ mi/mi}^2$)
Alt. A	472	2,353	11,662
Alt. B	863	2,377	11,247
Alt. C	863	2,377	11,247
Alt. D	863	2,377	11,247

Alternative A would have the greatest amount of BLM land with “high” road densities of greater than 2 mi/mi^2 . Alternatives B, C, and D would all have the same acreage in each road density category, reflecting that each of these alternatives provides for the same mileage (2.7 miles) of road decommissioning. By this measure, each of the action alternatives would benefit hydrologic function equally. All action alternatives would improve hydrologic function compared to Alternative A.

Motorized routes within 300 feet of streams generally have greater potential to directly impact water quality through erosion and sedimentation, increased water temperatures (due to loss of shading vegetation), and direct alteration of stream channel morphology than those farther away. **Table 4-81** shows the miles of open and closed roads on BLM lands within 300 feet of streams by alternative. Under Alternative A there are about 2.5 miles of open road within 300 feet of fish

Table 4-81 Miles of Open and Closed Roads on BLM Lands Within 300 feet of Fish-Bearing streams and Perennial, Non-fish-Bearing Streams by Alternative for the Boulder/Jefferson City TPA				
	Perennial Fish-Bearing Streams		Perennial Non-Fish-Bearing Streams	
	# Open Road Miles	# Closed Road Miles	# Open Road Miles	# Closed Road Miles
Alt. A	2.5	0	7.7	0
Alt. B	2.0	0.5	4.5	3.2
Alt. C	2.0	0.5	4.5	3.2
Alt. D	2.0	0.5	5.3	2.4

Note: Open roads include seasonally open roads as well as roads open yearlong. Closed roads include decommissioned roads.

bearing streams and 7.7 road miles within 300 feet of perennial non-fish bearing streams. Alternatives B and C would improve water quality to the same degree by closing or decommissioning the same mileage of roads in close proximity to perennial streams (total of 3.7 miles).

Alternative D would close or decommission 2.9 road miles in these areas and would therefore have greater improvements to water resources than Alternative A, but fewer improvements than Alternatives B and C. Each action alternative would improve water resources to some degree compared to Alternative A.

Cumulative Effects on Water Resources

Cumulative effects to water resources in the Boulder/Jefferson City TPA would arise from many past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 60,418-acre TPA, BLM lands make up 14,487 acres or 24 percent of lands. The approximately 60 miles of BLM roads make up about 15 percent of the approximately 392 road miles in the entire TPA. Therefore road-related effects to water resources described by alternative would be related to about 15 percent of all roads in the TPA. There are about 32 miles of fish bearing stream and an additional 81 miles of perennial non-fish bearing stream in the TPA. On BLM lands there are about 4 miles of fish bearing stream and an additional 13.5 miles of perennial non-fish bearing stream. The majority of lands and roads (about 50 percent of each) within the TPA boundary are private property. Remaining roads are managed by Jefferson County, the Forest Service, state, and private landowners.

Some of the main access roads (non-BLM) follow valley bottoms and parallel streams. Many of these roads are directly affecting stream channel or floodplain function by filling or impinging on stream channels or floodplains, precluding the presence of riparian vegetation (including large woody material in forested locations), producing sedimentation in streams (from road surfaces, ditchlines, winter "road sanding" operations) and potentially increasing thermal loading by lessening streamside shade. These effects are

dominant in shaping stream channel and water quality conditions in many areas and will continue into the foreseeable future.

Reclamation of abandoned mine lands has contributed to improved water quality at a number of locations throughout this TPA. Riparian areas along about 3.7 miles of High Ore Creek underwent removal of contaminated tailings and waste rock and subsequent revegetation in 1999-2000. Big Limber Gulch (tributary to Cataract Creek) and Spring Creek (tributary to Prickly Pear Creek in Upper Missouri River watershed) have also undergone recent reclamation to reduce heavy metal contamination from mine waste dumps and a smelter site near the community of Wickes. Another site near Wickes is also being reclaimed to address potential acid mine drainage that could lead to heavy metal and other water quality concerns.

Ongoing ground disturbing activity associated with mining for lead, zinc, gold, and silver from an open pit mine (Montana Tunnels Mine) near Jefferson City is likely to continue through approximately 2008. The permitted mine is approximately 1,500 acres in size with 130 of those acres on BLM land. This mine is likely to be expanded in the near future in a manner that will eliminate approximately 0.5 mile of fish-bearing aquatic habitat in Clancy Creek.

Approximately 2,051 acres of BLM lands are permitted for various rights-of-way and leases. Approximately 1,256 of these acres are for road rights-of-way. The remaining 795 acres are associated with power lines, communication sites, and other utility facilities. Of these acres, approximately 682 acres are associated with powerlines and have substantial vegetative ground cover over most areas to prevent erosion/sedimentation effects to water resources. Impacts to water resources are generally minor with some localized erosion and sedimentation and some contribution to decreased hydrologic function (decreased infiltration, increased runoff) due to compaction.

Selective timber harvest has occurred on approximately 259 acres of BLM lands in the TPA from 1984 to 1995. From 1995 to the present timber harvest occurred on 7 BLM acres while post-wildland fire timber salvage

occurred on about 559 BLM acres as well as an unknown amount of private land. Adverse effects on water resources were minor from this activity. Timber harvest has also occurred on private and Forest Service lands and will likely continue to have variable effects on water resources for the foreseeable future. Ground disturbance from these activities will have localized impacts to water resources including some sedimentation, loss of woody material recruitment for streams, and potential water temperature increases due to shade loss.

In 2000, a wildland fire burned approximately 10,800 acres in this TPA, approximately 4,670 of which were BLM lands. Tree planting on approximately 690 BLM acres of this burned area have contributed to longer term soil stabilization. The fire burned with variable intensity and severity creating a range of effects to water resources. In burned areas, nutrient inputs to streams increased, perhaps for several years. Streams in more severely burned areas underwent more severe erosion and sedimentation than those in areas burned less severely. Water temperatures in some streams may have increased due to loss of stream-side shade from the fires. Wood recruitment to streams in areas of high burn intensity may be increasing due to riparian tree mortality from fires. Stream flows may increase in some streams for several years. Peak flows may increase due to reduced snow interception by vegetation resulting in greater snow accumulations available for snowmelt in warmer periods. Summer flows may increase due a lack of live vegetation to conduct evapotranspiration of water so more groundwater may reach stream channels. Fire rehabilitation activities such as reseeding burnt ground with grasses/herbaceous species, waterbarring of firelines, and post-fire noxious weed treatments helped stabilize soils and minimize sedimentation effects to streams due to post-fire erosion. Tree planting on approximately 690 BLM acres of this burned area have contributed to longer term soil stabilization and subsequent reduction of stream sedimentation.

Fuels treatments conducted on private and Forest Service lands will likely occur for the foreseeable future with variable effects to soils. Reducing fuels under the controlled conditions of deliberate treatments may benefit water resources in the long-term by reducing the risk of high severity fires that could have severe adverse water quality effects in treated areas.

Increasing residential development will likely continue for the foreseeable future to variable degrees within the TPA. Erosion, soil compaction, and runoff would likely increase due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments. Nutrient, chemical pollutant, and pathogen inputs to streams would also likely increase due to leaching from septic systems, urban runoff (fertilizer, chemicals, and petroleum pollutants), and waste from livestock.

Livestock grazing on public and private lands throughout much of the Boulder/Jefferson City TPA has created areas of localized streambank trampling, soil erosion and compaction, and nutrient inputs to streams. In severe cases stream channel morphology may be altered due to severe loss of riparian vegetation, loss of streambank integrity, channel widening and shallowing, and substantial sediment inputs. These effects to water quality will continue to occur for the foreseeable future.

Several streams listed as impaired by MDEQ flow through BLM lands in this TPA. Boulder River (0.9 mile on BLM lands) is affected by heavy metal contamination due to acid mine drainage and abandoned mine lands, as well as direct habitat alteration due to highways, bridges, and impacts from historic mining. Big Limber Gulch (1.6 miles on BLM) is still listed as impaired due to heavy metal contamination from acid mine drainage and abandoned mine lands. High Ore Creek (2.1 miles on BLM) remains listed as impaired for heavy metal contamination, sedimentation, alteration of aquatic habitat, water temperature, and total suspended solids impairments. Probable causes of impairments include acid mine drainage, abandoned mine lands, rangeland grazing, roads (most notably a non-BLM valley bottom road), and timber harvest. Cataract Creek (0.4 mile on BLM) is impaired by heavy metal contamination from acid mine drainage and abandoned mine lands. Clancy Creek (0.2 mile on BLM) is impaired by aquatic habitat alteration, sedimentation, and heavy metal contamination. Probable causes of impairments include abandoned mine lands, acid mine drainage, animal feeding operations, riparian grazing, and road impacts (a non-BLM valley bottom road). These impairments will continue for the foreseeable future. In the case of each of these impaired streams, BLM roads are not located in such a manner and are not a great enough proportion of ongoing activities as to play a substantial role in affecting water resource conditions. In each case where roads are listed as probable causes of impairment, there is a non-BLM valley bottom road paralleling the stream.

Under Alternative A for the Boulder/Jefferson City TPA, the contribution to cumulative effects on water resources from BLM road management would continue as it occurs today. Retaining approximately 60 miles of road open yearlong would allow for the same level of effects to water resources that currently exists.

From a BLM road management perspective, all action alternatives would benefit water resources compared to Alternative A. Alternative B would benefit water resources by providing for a reduced contribution to adverse cumulative effects than would Alternative A because about 55 percent of BLM roads would be closed or decommissioned under Alternative B. Of the approximately 27 miles of open road under Alternative B, most of them (23 miles) would be seasonally restricted to exclude motorized vehicle use in the wet spring runoff period each year. This would reduce

erosion from these roads and further benefit water resources.

Although the action alternatives provide for the same degree of road decommissioning overall and road closure/decommissioning within 300 feet of streams, Alternative C would provide for the least contribution to adverse cumulative effects (greatest benefits) on water resources of all alternatives. This alternative would provide for closure or decommissioning of about 62 percent of BLM roads in the TPA, thus allowing these areas to vegetatively recover, stabilize soils, and reduce erosional outputs to streams. The majority of open roads under this alternative (approximately 20 out of 23 miles) would be seasonally restricted to exclude motorized use between 12/2 to 5/15 each year. As with Alternative B, this seasonal closure would prevent motorized use during the wet spring snowmelt/runoff period and would therefore reduce soil erosion and subsequent sedimentation effects to streams.

Of the action alternatives, Alternative D would provide for the greatest contribution to adverse cumulative effects on water resources, but would still provide for greater long-term benefits than Alternative A. Alternative D would provide for closure or decommissioning of about 40 percent of BLM roads in the TPA. As with Alternatives B and C, the majority of open BLM roads (about 33 out of 38 miles) would be seasonally restricted to exclude motorized use between 12/2 to 5/15 each year. This would allow for the same type of beneficial effects to soils described above for Alternatives B and C though to a slightly lesser degree because more roads would remain open under Alternative D.

Due to the scattered distribution and relatively small proportion of BLM lands (24 percent) and roads (15 percent) relative to the total quantities of land and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on water resources in the Boulder/Jefferson City TPA.

VEGETATIVE COMMUNITIES – FOREST RESOURCES AND FOREST AND WOODLAND PRODUCTS

Effects of the Alternatives

Under all alternatives, existing roads and roads built to access timber and forest product sales on BLM lands may encourage timber harvest and forest product sales on adjacent lands, particularly where landowners and other agencies looking to improve economic efficiency or opportunities in the management on their lands.

In general, vegetative treatment contractors tend to bid more readily on projects in areas with vehicle access or valuable products. BLM often prioritizes forest vegetation management activities such as forest products

and forest protection activities (e.g. wildfire suppression and forest insect and disease control) in similar areas.

Rehabilitation of roads (decommissioning and in some cases road closure) would revegetate currently unvegetated roadbeds, which would increase vegetation biomass production on the landscape through colonization of sites with grasses, forbs, shrubs, and trees. Increases in revegetated area would occur at a rate of approximately 1.5 to 3 acres per mile of rehabilitated road. Eventually rehabilitated roads would support plant communities consistent with site potentials which would help resist weed invasions. However, road closures and removals could make vegetation management treatments more difficult and costly, thereby inhibiting proposed treatments, reducing public access for product use and removal, and potentially slowing fire detection and suppression.

Under Alternative A there would be no increase in project analysis and implementation costs. However, under Alternative B approximately 55 percent of BLM roads would be closed. Under Alternative C about 61 percent of roads would be closed, while under Alternative D about 38 percent of these roads would be closed. These closures would result in commensurate potential increases in vegetative analysis and treatment costs by alternative. These potential cost increases would be considered on a case by case basis by the BLM during project feasibility determinations, and additional funding may be needed to analyze and implement the projects that would remain feasible. Road closures could also result in potential decreases in quantities of forest products removed. Temporary roads have been commonly built in the Boulder/Jefferson TPA to access forest treatment areas and probably will continue to be used in the future. In the Boulder/Jefferson TPA forest product values are typically low, contributing to reduced feasibility of some projects in areas with closed roads. The extent of the effects described above would be minimized because BLM would likely still be able to plan and implement projects in many areas on closed roads through the variance process for temporary road use. Road-related effects would be greatest under Alternative C, followed in sequence by Alternative B, then Alternative D.

Roaded access to forested areas would also affect the gathering of firewood and other forest products by the general public. Most public parties prefer to drive close to areas of product removal so they do not have to carry products over long distances to their vehicles. Alternative A would have the greatest opportunity for firewood and other product removal with 60.5 miles of BLM road open yearlong. Alternative B would provide fewer opportunities than Alternative A with 27.3 miles of open road. Alternative C would provide the fewest opportunities of all alternatives with 23.5 miles of open road. Alternative D (38.1 open road miles) would provide more opportunities than Alternatives B and C,

but fewer than Alternative A. Winter seasonal closures on many roads (closed 12/2-5/15) could affect firewood and Christmas tree harvest in the Boulder/Jefferson TPA under the action alternatives. Alternatives B, C, and D contain winter closures that affect from one third (20.6 miles) to more than one half (34.2 miles) of total open BLM roads in the TPA. For the Boulder/Jefferson City TPA, Alternative A would retain the most public opportunities for these activities, followed in sequence of decreasing opportunities by Alternative D, Alternative B, than Alternative C.

Cumulative Effects on Forest and Woodland Resources and Products

Forested vegetation in the Boulder/Jefferson TPA was greatly impacted by a large wildfire during the summer of 2000. The resulting forest condition includes widespread tree mortality with burned understory vegetation on 32 percent of BLM lands within the TPA. In the BLM burned area, 690 acres were salvage logged, followed by restoration tree planting. Adjacent areas of private ownership were also salvage logged following the wildfire. Since 1984, timber harvest has also occurred on 266 acres of green forest. These activities resulted in the removal of forest products and the associated forest restoration, resulting in open stands with more diverse understories. Approximately 500 forested acres have also been prescribe burned, resulting in some tree mortality, short-term erosion, and more open stand conditions in forested areas. Current planning includes additional treatment of 650 acres in the Boulder/Jefferson TPA.

Currently, western spruce budworm and Douglas-fir beetle are present in forests within the Boulder/Jefferson TPA. These insects have been present at similar levels in the past and are expected to remain in the future. These species can reduce forest health and individual tree vigor, sometimes resulting in mortality. Because 32 percent of BLM land in the TPA was burned with 690 acres subsequently replanted, many stands in the central portion of the TPA are in early successional stages and therefore are not at risk for insect infestation. Differences between travel planning alternatives would be negligible in regard to effects on or from the insect populations.

Road decommissioning (2.7 road miles) and associated rehabilitation proposed under all action alternatives would not have major cumulative effects on forest resources or forest products in the Boulder/Jefferson TPA. Approximately 6 acres of road could be colonized by trees under the action alternatives, while no roads would be decommissioned under Alternative A.

Forested vegetation in the Boulder/Jefferson TPA will also be affected by approximately 2,051 acres of rights-of-way and leases on BLM land. Large trees in these areas will generally be harvested for product to accommodate the necessary access or facilities. Forest

vegetation removal would occur on new authorizations in the future and would occur as necessary to maintain sight distances and safety clearances associated with roads and facilities.

Urbanization is expected to continue on the 31,705 acres of private land (52 percent of all lands) within the Boulder/Jefferson TPA. Forest products are commonly removed from these areas prior to permanent construction. Urbanization is likely to continue in the future and will affect forested vegetation at an unknown rate. Due to the preponderance of private lands in the TPA, urbanization and activities on open roads in the vicinity may have more cumulative effects on forested vegetation in the TPA than BLM decisions regarding miles of open and closed road.

Risk to forests from human-caused wildfires is commonly associated with open roads. Risk to forests from wildfire is greatest under Alternative A with 60.5 miles of road open during the summer (and yearlong). Alternative B would have less risk of human-caused fire starts with 27.3 miles of road open during summer. Alternative C would have the least risk to forests with only 23.5 miles of road open during summer months. Alternative D (38.1 miles of open road during summer) would have more risk than either Alternatives B or C, but less risk than Alternative A. Since a high percentage of the forested acreage in the central portion of this TPA has already burned, fewer acres are anticipated to be affected by wildfire in the foreseeable future. Given that the majority of roads in the TPA (84.6 percent) are non-BLM roads, this contribution to reduced fire risk from BLM roads in the action alternatives is relatively small in the context of the entire TPA.

Since BLM roads constitute only 15.4 percent of all roads in this TPA, and BLM lands make up only 24 percent of all lands in the TPA, urbanization and activities on open non-BLM roads in the vicinity may have more cumulative effects on forested vegetation in the TPA than BLM decisions regarding miles of open and closed road.

VEGETATIVE COMMUNITIES -NOXIOUS WEEDS

Under all alternatives, any snowmobile use would have negligible effects on noxious weed spread and populations. Invasive noxious weeds and non-native species are degrading wildland health. These are aggressive plants that can outcompete many native plants, as they have few natural enemies to keep them from dominating an ecosystem. These plant species are spread by many means. However, any land disturbing activity in the TPA has the most potential to introduce and spread weed species. Motorized vehicles are one vector for noxious weed spread as weed seed becomes attached to vehicles and their tires, and are transported from one area to another where seeds become detached and germinate to inhabit new areas.

Effects of Alternative A

Under Alternative A all BLM managed routes in the Boulder/Jefferson City TPA would continue to be managed as open yearlong (60.5 miles, 0 miles seasonally restricted or closed). No non-motorized routes or trails are available under this alternative. Snowmobile use would continue to be managed as open to area-wide cross country travel as well as travel on all existing routes (during the season of use, 12/2-5/15, conditions permitting). Alternative A would have the most roads open and in turn would promote the greatest amount of weeds and other undesirable plant spread and production. More herbicide control would be needed to control weeds in Alternative A than the other alternatives. Under Alternative A the open BLM roads would represent about 15.4 percent of all open roads in the Boulder/Jefferson City TPA.

Effects of Alternative B

Under Alternative B, 27.3 miles of routes would be available for wheeled motorized use (3.7 miles open yearlong, 23.6 miles seasonally restricted). Closure and decommissioning of routes in the southwest corner of the TPA would help create a non-motorized use area and reduce weed spread related to motorized use. This alternative would close 30.5 miles of road leaving 3.7 miles open yearlong as compared to 60.5 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase weed spread on the open routes because of the more concentrated use of these routes. Overall Alternative B would reduce weed spread, but would increase weed treatment costs per road mile on the remaining open roads compared to Alternative A. Under Alternative B, the 27.3 open road miles (including seasonally restricted routes) would make up about 7 percent of all open roads in the Boulder/Jefferson City TPA.

Effects of Alternative C

Under Alternative C, 23.5 miles of routes would be available for wheeled motorized use (3.0 miles open yearlong, 20.5 miles seasonally restricted). Closure and decommissioning of routes in the southwest corner of the TPA would help create a non-motorized use area and reduce weed spread related to motorized use in this area. This alternative would close 34.2 miles of road leaving 3.0 miles open yearlong as compared to 60.5 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase spread on the open routes because of the more concentrated use of these routes. Overall Alternative C would reduce weed spread more than any other alternative, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. Under Alternative C the 23.5 miles of open BLM road

would make up about 6 percent of all open roads in the TPA.

Effects of Alternative D

Under Alternative D, 38.1 miles of routes would be available for wheeled motorized use (5.3 miles open yearlong, 20.5 miles seasonally restricted). This alternative would close 20.6 miles of road leaving 5.3 miles open yearlong as compared to 60.5 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on the closed routes, but would increase spread on the open routes because of the more concentrated use of these routes. Over Alternative D would reduce weed spread more than Alternative A but less than Alternatives B and C, but would increase weed treatment costs per road miles on the remaining open roads miles compared to Alternative A. Under Alternative D, the 38.1 miles of open BLM road would make up about 9.7 percent of all open road miles in the Boulder/Jefferson TPA.

Cumulative Effects on Noxious Weeds

Under all alternatives, other past, present, and reasonably foreseeable future BLM and non-BLM actions affect noxious weeds.

Recreational activities for this TPA include big game hunting, motorized OHV travel (motorcycles, ATVs, snowmobiles), and to a lesser extent, non-motorized uses (hiking, horseback riding, and mountain biking). Motorized recreation uses are one of the leading causes of introduction and spread of noxious weeds and non native species. Weed seeds are transported by many recreational vectors i.e. motorized vehicles including their tires, non-motorized vehicles including their tires, pack animals, and humans. Applications for right-of-way permits on public lands to access private property or for commercial development are likely to increase in the future as urban development increases. As a result, soil disturbing activities (i.e. roads, powerlines, telephone lines, etc.), will likely increase, causing weeds to increase.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuel reduction projects, could affect the TPA. There have been no fuels treatments in this area in the last 10 years and there are none planned on BLM lands for the foreseeable future. Any project creating soil disturbance has the capability to increase weedy plant species. Prescribed burning projects give the ground surface a fertilization effect and eliminate some plant competition for weedy species giving them a niche for establishment and expansion in some areas. Ground disturbing equipment could also transport noxious weed seed to these project sites. BLM implements weed control measures in the aftermath of such ground-disturbing activities so as to minimize noxious weed spread.

Wildland fires create good seed beds and supply nutrients for weed species introduction and production. From 1981 to 2004 there has been one wildland fire (the 2000 High Ore Fire) that burned approximately 4,600 acres of BLM land. This fire has promoted and increased noxious weed production in this TPA. BLM implemented weed control measures as part of the fire rehabilitation work associated with this fire.

The TPA has a rich history of mining for lead, zinc, gold, copper, and silver. With the exception of the Montana Tunnels Mine, the remaining mines are no longer active; many have been reclaimed by either the BLM or state of Montana. The Montana Tunnels Mine continues to produce lead and zinc with associated gold and silver from an open pit. The mine is located near Jefferson City, and is approx. 1,500 acres in size (including 130 acres of BLM land). Increases in mineral prices could lead to additional increased or renewed mining activity. Mining is a land disturbing activity and the activity itself and weed seed contaminated equipment that is used could promote weeds in the area. Abandoned mine reclamation work conducted by BLM can also contribute to increased weed spread. BLM implements weed control measures associated with these projects to minimize this impact.

Noxious weeds and non-native invasive species are well established and spreading in the area. Weed control activities by BLM and other entities, while often effective at reducing or minimizing weed spread and weed populations, can also lead to some weed spread. Herbicide spray equipment is driven through weed infestations and weed seeds as well as other weed vegetative parts are spread to other lands during and following treatment. The High Ore Wildfire area received ground and aerial herbicide treatments of about 300 to 400 acres in size following the fire. In recent years, treatments using herbicide (ground) and biological controls have been accomplished on approximately 250 acres. These weed treatments have varying success in killing undesirable plants, depending on many environmental parameters. Timber sales have built-in stipulations for mitigating weed production and spread. However, with ground disturbance the potential exists for weed introduction to occur on these sites. Since 1995 there have been 559 acres of timber salvage and 7 acres of timber harvest and 690 acres of forest planting (replanted in 2002). Vehicular access for tree plantings could contribute to the spread of existing weeds on site. Herbicide treatment of existing weeds is coordinated with tree seedling planting locations and timing, so as to minimize potential exacerbation of weed spread.

Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, BLM routes available to motorized use could experience increased

use from displaced users, leading to more concentrated use, increased resource impacts, and user conflicts.

The TPA mainly provides habitat for big game. The entire area is considered winter range for elk while the lower elevations along the eastern half of the travel plan are winter range for mule deer. Noxious weed seeds are transported and spread by wildlife through their digestive system and by attaching to the animals themselves and then being released at a later time.

Livestock grazing on and off BLM lands also contributes to weed spread either through seed being spread or introduced by livestock themselves, or through vehicular uses needed to manage grazing operations.

The Boulder-Jefferson City TPA is located adjacent to the upper Boulder Valley. Human population growth for the upper Boulder Valley (Boulder town statistics) is approximately 2 percent per year. This rate of growth is expected to continue, along with increased recreational use from local residents and area users (residents of Helena and Butte). The increasing population in the Butte and Helena area will in turn lead to an increase in use of this TPA creating more opportunities for weed spread and production.

The small towns of Boulder (population 1,436) and Jefferson City (population 295) are located adjacent to the TPA. The present rate of growth is approximately 2 percent per year, but could increase as Helena Valley area development begins to branch out. The residential development between Jefferson City and Boulder is increasing. Use of the TPA by the residents living adjacent to or within this area will lead to an increase in weed spread and propagation.

About 15.4 percent of all the travel routes in the Boulder/Jefferson City TPA are located on BLM managed lands (under Alternative A). Lands near roads and away from roads in the TPA are infested with weeds. The travel on these roads is spreading weeds and weeds off these roads are being spread by the weed plants themselves and other natural means. Because the majority of roads (85 percent) and lands (76 percent) in the TPA are non-BLM, activities in these areas play a stronger role than activities on BLM lands in determining the status of weed spread and weed populations overall at the scale of the entire TPA.

VEGETATIVE COMMUNITIES -RIPARIAN VEGETATION

Effects Common to All Alternatives

This section focuses on effects to riparian vegetation. For additional discussion of effects to water quality and stream channels, see the Water Resources and Fish sections.

Roads in riparian areas constitute ground disturbance that can eliminate or preclude presence of native riparian

vegetation. This ground disturbance and loss of riparian vegetation may facilitate erosion and sedimentation of streams. Roads may also interfere with natural stream channel functions by occupying floodplains or active stream channel margins (see Water Resources section for more discussion). Noxious weeds may dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation. Noxious weed seed can be spread into riparian areas by motor vehicles via open roads. Closure of roads and trails can improve or maintain riparian condition by reducing avenues of noxious weed spread, as well as allowing for bare area re-vegetation which filters sediment in addition to stabilizing banks in some areas. Road and trail restrictions have the same effects but to a lesser degree, because some traffic will inhibit vegetation growth and recovery.

Effects of the Alternatives

As a means of comparing alternatives, **Table 4-82** depicts the miles of wheeled motorized routes that cross or are within 300 feet of streams or wet areas on BLM lands in the Boulder/Jefferson City TPA.

Table 4-82 Miles of Roads and Trails by Proposed Management Category within 300 feet of Streams (including intermittent streams) in the Boulder/Jefferson City Travel Planning Area				
Miles of Wheeled Motorized Routes	ALT A	ALT B	ALT C	ALT D
Open	21.7	9.4	9.4	9.5
Restricted	0	4.6	4.5	7.7
Closed	0	7.7	7.8	4.5

Under Alternative A, 21.7 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas on BLM lands. The noxious weed spread, streambank, and sediment delivery effects would continue as described in the Effects Common to All Alternatives section. The BLM roads and trails most affecting riparian conditions along Kady Gulch, Boomerang Gulch, Black Jim Gulch, Stagecoach Gulch and Big Limber Gulch would remain open. Alternative A would pose the greatest adverse effects to riparian vegetation of all alternatives.

Under Alternative B, 9.4 miles of roads and trails would remain open that cross or are within 300 feet of streams or wet areas, 4.6 miles of roads and trails would have seasonal restrictions, and 7.7 miles of roads and trails would be closed. The noxious weed spread, streambank, and sediment delivery effects would be reduced in comparison to Alternative A. Big Limber Gulch, High Ore Creek and Spring Creek roads and trails which impact riparian areas would remain open because these roads provide access to private lands. Riparian impacted

roads and trails along Spencer Creek, Stagecoach Gulch, Black Jim Gulch, and Lower Boomerang Gulch would be closed. Roads and trails along Peters Gulch, the west fork of Boomerang Gulch, and Kady Gulch would have seasonal restrictions on use (closed 12/2-5/15).

Under Alternative C, 9.4 miles of roads and trails would remain open that cross or are within 300 feet of riparian areas, 4.5 miles of roads and trails would have restrictions, and 7.8 miles of roads and trails would be closed. The noxious weed spread, streambank, and sediment delivery effects would be reduced in comparison to Alternative A to the same degree as under Alternative B. Big Limber Gulch, High Ore Creek and Spring Creek roads and trails which impact riparian areas would remain open because these roads provide access to private lands. Riparian impacted roads and trails along Spencer Creek, Stagecoach Gulch, Black Jim Gulch, and Lower Boomerang Gulch would be closed. Roads and trails along Peters Gulch, the west fork of Boomerang Gulch, and Kady Gulch would have seasonal restrictions on use (closed 12/2-5/15).

Under Alternative D, 9.5 miles of roads and trails would remain open that cross or are within 300 feet of riparian areas, 7.7 miles of roads and trails would have restrictions, and 4.5 miles of roads and trails would be closed. The noxious weed spread, streambank, and sediment delivery effects would be reduced in comparison to Alternative A, but would be greater than under Alternatives B or C. As with all other alternatives, Big Limber Gulch, High Ore Creek and Spring Creek roads and trails which impact riparian areas would remain open because these roads provide access to private lands. Riparian impacted trails along Stagecoach Gulch, Black Jim Gulch, and Lower Boomerang Gulch would be closed. Also as with Alternatives B and C, roads and trails along Peters Gulch, Spencer Creek, the west fork of Boomerang Gulch, and Kady Gulch would have seasonal restrictions on use (closed 12/2-5/15).

Cumulative Effects on Riparian Vegetation

Noxious weed spread, mining, roads and trails, logging operations, and livestock grazing have affected riparian resource conditions in all TPAs, including the Boulder/Jefferson City TPA. Some of these factors continue to cause riparian area degradation primarily through direct disturbance or loss of riparian vegetation. Ground disturbance and loss of riparian vegetation facilitate erosion and sedimentation of streams. In the case of noxious weeds, they usually dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation.

Anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will increase severity of runoff events which in turn will cause more sediment delivery

to creeks and streams. The additional sediment is likely to affect the functioning condition of some riparian areas by causing streambeds to aggrade at unnatural rates. Streambanks may also be affected if road placements do not allow for natural stream movements or meanders.

Logging and forestry practices on public and private lands are subject to streamside management zone (SMZ) requirements designed to maintain water quality and riparian vegetation. The proposed Riparian Management Zones under Butte RMP Alternatives B and C would be wider than SMZs and activities in these areas would be designed to benefit riparian resources, thus providing more riparian protection and more targeted management of riparian vegetation in both forested and non-forested areas than under RMP Alternatives A and D. The disturbance associated with timber activities does have the potential to increase noxious weed spread which degrades riparian area function and health. On public lands noxious weed control is a standard feature of any ground disturbing activities whereas on private lands noxious weed control is variable.

Livestock grazing will continue in the area and has the potential to impact riparian resource conditions. On BLM lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain riparian vegetation health and vigor. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Riparian conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, riparian conditions would improve because of the streambank protection gained from shrubby root systems and filtering capability of native riparian sedge and rush species.

Reclamation of abandoned mine lands along Big Limber Gulch, High Ore Creek, Clancy Creek and Spring Creek near Wickes have improved riparian function and health in these watersheds. The removal of contaminated soil and improvement in water quality has caused riparian vegetation to recover and thrive. The future reclamation of the Montana Tunnels mine would

ensure a consistent base flow of acceptable water quality to the headwaters of Clancy Creek.

The Boulder complex fires of 2000 burned parts of the High Ore, Boomerang, Spring Creek, and Amazon watersheds. Before the vegetation could recover, subsequent storm events caused streambank scouring to occur on parts of several streams in these watersheds. The fire was of sufficient size to allow several colonies of aspen along riparian reaches and uplands to regenerate. Because a large acreage burned, post-fire use by herbivores and ungulates was dispersed enough that it did not suppress young aspen suckers.

Cumulative effects under all the action alternatives would be similar to Alternative A at the scale of the entire TPA. The additional road and trail closures and seasonal restrictions on BLM roads in the action alternatives may slightly offset the cumulative road and trail impacts associated with subdivision development and other lands uses as compared to Alternative A. Alternative D would contribute less to riparian vegetation benefits than Alternatives B and C, but would contribute more benefits than Alternative A.

Overall, because BLM roads make up only 15.4 percent of all roads in the TPA (under Alternative A), and BLM lands make up 24 percent of all lands in the TPA, the contributions to riparian vegetation benefits associated with closing riparian roads on BLM lands under the action alternatives, while potentially substantial at the site scale, could be masked by activities on other lands at the scale of the entire Boulder/Jefferson City TPA. Activities on private lands (52 percent of total acreage in TPA) and USFS lands (23 percent of total acreage in TPA) would play a substantial role in determining riparian conditions at the scale of the entire TPA.

WILDLIFE

Effects of Alternative A

Under Alternative A, the Boulder/Jefferson City TPA would have substantially more open roads (60.5 miles) compared to the action alternatives and would have the highest actual road density, 3.3 mi/mi² (Table 4-83) of all alternatives. Open roads typically increase the level of recreation adjacent to roads which can result in

Table 4-83
Decision Area Road Densities (mi/mi²) within Elk Winter Range
in the Boulder-Jefferson City Travel Planning Area by Alternative

	Actual Road Density	Acres of Low Road Density	Acres of Moderate Road Density	Acres of High Road Density
Alternative A	3.3	483	2,341	11,662
Alternative B	0.8	3,985	5,304	5,198
Alternative C	0.8	4,035	5,571	4,881
Alternative D	0.9	3,938	4,967	5,582

Low Density = 0-1 mi/mi², Moderate Density = 1-2 mi/mi², High Density = >2 mi/mi²

additional disturbance and displacement of wildlife species. Roads can also encourage the public to recreate in areas that had formerly been secluded. Roads can cause direct mortality to wildlife through road kill, prevent wildlife movement, create disturbance to wildlife via vehicular use, cause the spread of noxious weeds, reduce habitat and cause habitat fragmentation on the landscape. Permanent and temporary roads could negatively impact wildlife including special status species, particularly if roads are open during critical periods such as wintering or during the breeding season.

High open road densities under Alternative A could result in the loss of year-round habitat and migration corridors, disturbance and displacement of wildlife, road kill and fragmentation of habitat. Wildlife, including special status species, that are especially sensitive to roads in the TPA include (but are not limited to) elk and northern goshawk. The detrimental effects of open road densities to all wildlife species found in this TPA under Alternative A could be minor to major and long-term. This alternative would have the greatest negative impacts to wildlife including special status species from open roads.

This TPA would also have substantially fewer acres of functional big game winter range (approximately 483 acres in areas with low road density) compared to the action alternatives (**Table 4-83**). Functional winter range is similar under the action alternatives with 3,985 acres under Alternative B, 4,035 acres under Alternative C and 3,938 acres under Alternative D.

With Alternatives A, B and D, the TPA would be open to cross country snowmobile use. BLM lands in this TPA, however, do not often get favorable snow conditions for snowmobile use. Due to snow conditions, the use of snowmobiles would be limited and the effects to wintering big game and other wildlife species would be expected to be minimal the majority of the time. However, when snow conditions do become favorable, snowmobile use of the TPA could have considerable negative effects to big game and other wildlife species. The negative affects due to cross-country snowmobile use could include harassment of big game during the high stress winter season. This could cause individuals to leave an area (temporarily or permanently) and/or an increase in stress that could lead to mortality.

In evaluating impacts of travel planning on elk and other big game species, it is important to consider impacts on security habitat. Elk security is the inherent protection allowing elk to remain in an area despite increases in stress or disturbance associated with the hunting season or other human activities. Security habitat includes blocks of nonlinear forested habitats greater than 250 acres in size that are at least 0.5 mile from an open road. Security habitat should also consist of larger trees (greater than 8 inches DBH) with vegetation dense enough to hide an adult elk. Due to the fragmentation of BLM lands and high road densities adjacent to BLM

lands, none of the alternatives would provide big game security habitat in the Boulder/Jefferson TPA.

Core areas are areas large enough for wildlife (especially animals with large home ranges such as carnivores and big game) to forage and reproduce. Subcore areas are areas that could act as stepping stones for wildlife as they move through the region. Within all lands of the Boulder/Jefferson City TPA there are approximately 20,631 acres identified as "core/subcore" habitat. Under Alternative A, there would be 1,113 acres of core/subcore habitat with low road density (less than the action alternatives), 4,015 acres with moderate road density and 15,503 acres with high road density (more than all action alternatives) for all land ownerships.

On BLM lands, there are 2,958 acres in core/subcore habitat. Within the Boulder/Jefferson City TPA, all but 20 acres would have high road densities in core and subcore habitat under Alternative A.

Wildlife corridors are areas of predicted movement within or between core and subcore areas. Within the TPA, there are approximately 13,180 acres identified as "high quality" wildlife movement corridors under all land ownerships. All alternatives would have a similar number of acres with low road densities (677 acres) in movement corridors. Alternative A, however, would have fewer acres with moderate road density (3,556 acres) than the action alternatives and the majority of acres under this alternative (8,948 acres) would have high road densities. Although these areas have been mapped as "high quality" movement corridors, the presence of high road densities could reduce or limit the quality of habitat available to wildlife.

On BLM lands in the TPA, there are 6,659 acres mapped as high quality movement corridors. Under Alternative A, the majority of habitat in mapped high quality movement corridors would have high road densities (4,264 acres) with 1,944 acres in moderate road densities and only 450 acres with low road densities. Alternative A would provide the lowest quality habitat in wildlife movement corridors compared to all other alternatives.

Riparian areas provide crucial habitat and critical travel corridors for wildlife including special status species. Riparian areas also provide a refuge for native plants and animals in times of stress such as drought or fire. Roads in riparian areas can prevent use of these crucial areas by wildlife, limit use or cause loss of habitat. Under Alternative A, there would be 21.7 miles of open roads in riparian areas.

Effects of Alternative B

Under Alternative B, Boulder/Jefferson City TPA would have substantially fewer open roads (27 miles) compared to Alternative A (60.5 miles). Of the 27 miles of open roads, only 3.7 miles would be open year-round and the remaining 23.6 miles would be seasonally restricted. Alternative B would have more open roads than

Alternative C (23.5 miles) but less than Alternative D (38 miles). Alternative B would decrease harassment to wildlife during all seasons of use, especially during the winter and spring, over Alternatives A and D. This alternative would improve habitat and reduce fragmentation more than Alternatives A and D but less than Alternative C.

Under Alternative B, the actual road density in elk winter range would be 0.8 mi/mi², below the maximum of 1 mi/mi² recommended by MFWP in big game winter range (**Table 4-83**). This is substantially lower than the road density under Alternative A (3.3 mi/mi²), the same as under Alternative C and similar to Alternative D (0.9 mi/mi²).

Under Alternative B there would be substantially more acres of functional winter range (3,985 acres in low road density) compared to Alternative A (483 acres) but this alternative would have a similar number of acres compared to Alternatives C and D (4,035 and 3,938 acres respectively) (**Table 4-83**).

Like Alternatives A and D, the entire Boulder/Jefferson City TPA would be open for cross country snowmobile use with Alternative B. The effects would be the same as described under Alternative A.

Under all land ownerships in core and subcore habitat, Alternative B would have the same acres in low road densities as Alternatives C and D (1,704 acres) which would be more than under Alternative A (1,113 acres). Alternative B would also have the same or similar acres in moderate (5,685 acres) and high (13,242 acres) road densities as Alternatives C and D. These acreages are higher than the moderate road density acreage (4,015 acres), and lower than the high road density acreage (15,503 acres) of Alternative A.

On BLM lands, there are approximately 2,958 acres in core/subcore habitat. Under Alternative A, all but 20 acres would have high road densities in core and subcore habitat on BLM lands. Although core and subcore habitat on BLM lands under the action alternatives would still be primarily in high road density (1,550 acres) there would also be 440 acres in low road density areas and 966 acres in moderate road density areas. The action alternatives would improve the quality of core and subcore habitat compared to Alternative A.

In high quality wildlife movement corridors for all land ownerships, Alternative B would substantially increase the acreage with low road density (approximately 3,770 acres) compared to Alternative A (677 acres). Alternatives B would also increase the acreage with moderate road density (5,235 acres) over Alternative A and would substantially lower the acreage with high road density to 4,170 acres compared to Alternative A (8,948 acres with high road density). All action alternatives would greatly improve habitat in high quality movement corridors over Alternative A but

Alternatives B and C would have more beneficial effects than Alternative D.

The quality of BLM lands mapped as high quality movement corridors would improve under Alternative B compared to Alternative A. All action alternatives would increase the acreage in low road density to (approximately 3,200 acres) compared to Alternative A (450 acres). Alternatives B and C would also increase the acreage with moderate road densities to (about 2,550 acres) compared to Alternative A (1,944 acres), and decrease the number of acres in high road densities to approximately 865 acres compared to 4,170 acres under Alternative A. All action alternatives would improve habitat in high quality movement corridors on BLM lands over Alternative A but Alternatives B and C would have more beneficial effects than Alternative D.

All action alternatives would protect and restore more riparian habitat than Alternative A by reducing the miles of open roads in riparian acres to 9.5 miles (from 21.7 under Alternative A). Reducing roads in riparian habitats under the action alternatives would allow for more breeding, foraging, and hiding habitat as well as improve movement corridors for a wide variety of species.

Effects of Alternative C

Under Alternative C, Boulder/Jefferson City TPA would have substantially fewer open roads (23.5 miles) compared to Alternative A (60.5 miles). Of the 23.5 miles of open roads, only 3.0 miles would be open year-round and the remaining 20.5 miles would be seasonally restricted. Alternative C also would have fewer open roads than Alternative B (27.3 miles) and Alternative D (38 miles). Alternative C would decrease harassment to wildlife during all seasons of use, especially during the winter and spring, over all alternatives. This alternative would also improve habitat and reduce fragmentation more than all other alternatives.

Under Alternative C, the actual road density in elk winter range would be 0.8 mi/mi², below the maximum of 1 mi/mi² recommended by MFWP in big game winter range. This is substantially lower than the road density under Alternative A (3.3 mi/mi²), the same as under Alternative B, and similar to Alternative D (0.9 mi/mi²) (**Table 4-83**).

Under Alternative C there would be substantially more acres of functional winter range (4,035 acres in low road density areas) compared to Alternative A (483 acres), but this alternative would have a similar amount of acres compared to Alternatives B and D (3,985 and 3,938 acres, respectively) (**Table 4-83**).

Alternative C would limit snowmobile use in the entire Boulder/Jefferson City TPA to open roads only (3 miles). This would substantially reduce the negative effects to wildlife from snowmobile use and be the most protective of all alternatives.

There would be no big game security habitat provided on BLM lands under Alternative C.

Effects associated with core and subcore habitat under Alternative C would be the same as under Alternative B. In high quality movement corridors for all land ownerships, Alternative C would substantially increase the acreage with low road density (approximately 3,770 acres) compared to Alternative A (677 acres). Alternative C would also increase the acreage with moderate road density (5,282 acres) over Alternative A (3,556 acres), and would lower the acreage with high road density to 4,113 acres compared to 8,948 acres under Alternative A. All action alternatives would improve habitat in high quality movement corridors over Alternative A but Alternatives C and B would have more beneficial effects than Alternative D.

The quality of BLM lands mapped as high quality movement corridors would improve under Alternative C compared to Alternative A. All action alternatives would increase the acres in low road density to (approximately 3,200) compared to Alternative A (450 acres). Alternatives C and B would also increase the acreage with moderate road density to about 2,550 acres, compared to Alternative A (1,944 acres). Alternative C would decrease the number of acres in high road density to approximately 865 acres, compared to 4,170 acres under Alternative A. All action alternatives would improve habitat in high quality movement corridors on BLM lands over Alternative A but Alternatives B and C would have more beneficial effects than Alternative D.

Effects associated with roads in riparian areas under Alternative C would be the same as under Alternative B.

Effects of Alternative D

Under Alternative D, the Boulder/Jefferson City TPA would have substantially fewer open roads (38 miles) compared to Alternative A (60.5 miles). Of the 38 miles of open roads, 5.3 miles would be open year-round and the remaining 32.8 miles would be seasonally restricted. Alternative D would have considerably more open roads than Alternative B (27 miles) and Alternative C (23.5 miles). Alternative D would decrease harassment to wildlife during all seasons of use, especially during the winter and spring, more than Alternative A but less than Alternatives B and C. This alternative would also improve habitat and reduce fragmentation more than Alternative A but less than Alternatives B and C.

Under Alternative D, the actual road density in elk winter range would be 0.9 mi/mi², below the maximum of 1 mi/mi² recommended by MFWP in big game winter range. This is substantially lower than the road density under Alternative A (3.3 mi/mi²) and slightly higher than Alternatives B and C (0.8 mi/mi²) (Table 4-83).

Under Alternative D, there would be substantially more acres of functional winter range (3,938 acres in low road density areas) compared to Alternative A (483 acres).

This alternative would have a similar amount of acres in this category compared to Alternatives B and C (3,985 and 4,035 acres, respectively) (Table 4-83).

Like Alternatives A and B, the entire Boulder/Jefferson City TPA would be open for cross country snowmobile use with Alternative D. The effects would be the same as described under Alternative A.

There would be no big game security habitat on BLM lands under Alternative D.

Under all land ownerships in core and subcore habitat, Alternative D would have the same acres in low road density as Alternatives B and C (1,704 acres) which would be more compared to Alternative A (1,113). Alternative D would also have nearly the same acreages in moderate (5,663 acres) and high (13,264) road densities as Alternatives B and C. These values would be more acres in moderate road density and fewer acres in high road density compared to Alternative A (4,015 and 15,503 acres, respectively).

Effects of Alternative D on core and subcore habitat on BLM lands would be the same as under Alternatives B and C. In high quality movement corridors for all land ownerships, Alternative D would substantially increase the acreage with low road density to 3,772 acres compared to Alternative A (677 acres). This would be similar to Alternatives B and C. Alternative D would also increase the acreage with moderate road density to 4,966 acres, compared to Alternative A (3,556 acres), but this would be less than Alternatives B and C (5,282 acres). Alternative D would also have slightly more acres with high road density (4,443 acres) compared to Alternatives B and C (4,113 acres), but would have fewer acres with high road density than Alternative A (8,948 acres). All action alternatives would improve habitat in high quality movement corridors over Alternative A but Alternative D would have fewer beneficial effects than Alternatives B and C.

In high quality movement corridors on BLM lands, Alternative D would have a similar acreage (3,203 acres) in low road density as Alternatives B and C but would have more than Alternative A (450 acres). Alternative D would have slightly fewer acres in moderate road density compared to Alternatives B and C (2,532 acres) but would have more when compared to Alternative A (1,944 acres). Alternative D would decrease the number of acres with high road density to 1,019 compared to Alternative A (4,170 acres), but would have more acres with high road density than Alternatives B and C (810 acres). All action alternatives would improve habitat in high quality movement corridors on BLM lands over Alternative A but Alternative D would have fewer beneficial effects than Alternatives B and C.

Effects associated with roads in riparian areas would be the same as under Alternatives B and C.

Cumulative Effects on Wildlife

Wildlife habitat in the Boulder/Jefferson City TPA has been affected by roads, historic and current mining, timber harvest and salvage, weed infestations, urbanization and development, recreation, power line corridor development and communication sites.

Human population growth for the upper Boulder Valley is approximately 2 percent per year. This rate of growth is expected to continue, along with increased recreational use from local residents and area users (residents of Helena and Butte). Recreational activities in the Boulder/Jefferson City TPA include hunting, motorized OHV travel (motorcycles, ATVs, snowmobiles), and to a lesser extent, non-motorized uses (hiking, horseback riding, and mountain biking).

The Boulder/Jefferson City TPA is within an area that was heavily affected by historic mining. There are five large mines which are no longer active and have had some level of reclamation by either the BLM or the State of Montana. Montana Tunnels is the only active mine and continues to produce lead and zinc with associated gold and silver from an open pit. The mine is located near Jefferson City, and is approximately 1,500 acres in size (including 130 acres of BLM land). It is expected that exploration for minerals would continue in the future. Mineral activity along with associated road construction and development on both private and public lands could add substantially to the negative cumulative effects to wildlife and wildlife habitats in this TPA.

In the TPA, there are 11 powerlines, two pipelines and seven communication sites. In the future, communication sites on BLM lands will be restricted to existing sites. There is the potential for future powerlines and pipelines to be built in this TPA and for additional communication sites to be built on private and other public lands.

There are approximately 26 rights-of-way (ROW) in the TPA and applications for ROW permits to access private property or for commercial development are likely to increase in the future. As a result, public access to BLM lands could increase. Fewer ROWs would be expected under Alternative A because all BLM roads would remain open under this alternative. Alternative B would be expected to have fewer ROWs than Alternative C but more than Alternatives A and D. Alternative C would be expected to have the most ROWs and, of the action alternatives, Alternative D would have the fewest.

Between 1984 and 1995 only 260 acres of timber harvest occurred on BLM lands in the TPA although more occurred on adjacent private lands. In 2000, the Boulder Fire burned approximately 10,800 acres of the entire TPA and approximately 4,670 acres in the Decision Area. After the fire, approximately 560 acres of timber salvage occurred on BLM lands and a substantial amount of acres on private lands were also heavily salvaged. Approximately 700 acres of BLM lands have

been replanted. Since private lands were heavily salvaged after the fire, it is not expected that timber harvest would occur on these lands for the next 20-40 years. Additional timber harvest or vegetation restoration may occur on BLM lands in the future, especially within meadows that were not burned and are experiencing conifer encroachment. Forest and fuels reduction treatments would be expected to be less under Alternatives A and C than under Alternatives B and D. Overall, vegetative treatments on BLM lands have had minor effects to wildlife habitat in the TPA. However, timber salvage on BLM lands has substantially reduced the distribution and amount of snag habitat for snag dependant in the salvage units. Timber harvest and salvage on private lands has altered the landscape and caused a decline in the quality and quantity of wildlife habitat in the TPA.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the TPA. Motorized activities play a large role in the distribution of noxious weeds. The cumulative effects of the spread of noxious weeds from open roads would be greater under Alternative A than all other alternatives. Alternative A would result in more wildlife habitat being lost or degraded due to noxious weed infestations compared to the action alternatives. Alternative B would have fewer open roads than Alternatives A and D resulting in fewer infestations of noxious weeds. Alternative C would close the most roads and would have the fewest cumulative effects from loss of habitat due to noxious weeds of all alternatives. Open roads adjacent to BLM land would still be a conduit for the spread of noxious weeds.

Fragmentation of BLM lands in the TPA (only 24 percent of the TPA is in BLM ownership); open roads on BLM lands (about 60.5 miles), on private lands (about 283 miles), and other public lands (about 48 miles) have reduced the quality of wildlife habitat within the TPA. Roads within the TPA cause disturbance to wildlife along with fragmentation and loss of habitat. Roads are associated with nearly every type of activity that has the potential to occur in the TPA including vegetation treatments, timber salvage, mining, access to private lands (ROWs), fire suppression, power line corridors, and recreation. Open roads in the Planning Area would likely increase due to development and management of private lands. Alternative A would have the greatest negative cumulative effects to wildlife and wildlife habitat from open roads with 60.5 miles of open roads. Alternative B would have fewer negative cumulative effects with 27 miles of open road than Alternatives A and D (38 open miles) but more than Alternative C (23.5 miles).

Alternative A would have the greatest negative cumulative effects from open roads to wildlife and wildlife habitat of all alternatives. Under Alternative A, habitat on BLM lands would not be restored and would continue to be degraded over time. Disturbance to

wildlife from open roads would continue to impact the distribution and use of the TPA by wildlife under Alternative A. Alternatives B and C would have greater beneficial cumulative effects to wildlife and wildlife habitats from closing roads than Alternatives A and D.

Historic and recent timber cutting, salvage harvest, past mining activity and firewood gathering in the TPA may have reduced the amount of suitable snag habitat for cavity nesting species as well as down woody material. Alternative A would allow continued access to the area for firewood cutting that would continue to prevent snag recruitment for snag dependant species and minimize the amount of down woody material. Alternative B would protect more snag and down wood habitat from loss due to firewood cutting than Alternatives A and D but would protect less of this habitat type than Alternative C.

High road densities in both the Decision and Planning Areas have prevented BLM lands from providing suitable security habitat for big game during the hunting seasons under any alternative. Lack of security habitat in this TPA would continue to be an issue with all alternatives although Alternatives B and C would slightly increase the amount of security habitat.

Habitat mapped as core and subcore habitat, and wildlife movement corridors having high road densities would continue to be of low value to wildlife under Alternative A. An increase in open roads in both the Decision and Planning Areas could result in a loss of core and subcore habitat under all alternatives but, especially, Alternative A. However, the cumulative effects to core and subcore habitat and wildlife movement corridors would be beneficial under the action alternatives, especially Alternatives B and C.

The cumulative effects of high road densities would continue to negatively affect wildlife species during the breeding season more with Alternative A than under the action alternatives. Alternatives B and C would have the most beneficial cumulative effects to wildlife during the breeding season compared to Alternative D and Alternative A.

FISH

For the sake of this discussion, "open" roads include roads that are open with seasonal restrictions as well as roads that are open yearlong. Roads identified as "closed" within 300 feet of streams also include roads that would be "decommissioned" in these areas by alternative. Effects to water quality described in the Water Resources section would affect fish populations and fish habitat quality. Analyses described and tabulated in the Water Resources section are referred to in the context of effects to fish in the discussion below.

Effects of Alternative A

Under Alternative A, the Boulder/Jefferson City TPA would have substantially more open roads (60.5 miles)

compared to the action alternatives. Generally, watersheds with high road densities often have the largest negative effects on fish and aquatic resources. Roads can have a wide range of effects on fish and fish habitat. These effects would include, but are not limited to, increased sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, conduits for noxious weeds, loss of riparian vegetation, potential decreases in stream shading that could lead to water temperature increases, loss of instream habitats and changes in local fish populations when culverts are impassable and limit fish migration.

Watershed (or hydrologic) function can be used as an indicator of relative risk or impacts to fish habitat. To determine the effects on watershed functions, a moving windows analysis was conducted on BLM lands to look at the miles of roads that would be decommissioned and removed from the landscape for each alternative. During this analysis, it was assumed that even though closing roads would improve watershed function, closed roads would remain on the landscape and could still have negative impacts to water quality and prevent or impede the restoration of riparian vegetation. Under Alternative A, there would be 472 acres with low road density (based on open and closed roads), 2,353 acres with moderate road density and 11,662 acres with high road density on BLM lands in this TPA (**Table 4-80**). Alternative A would have fewer acres with low road density and more acres with high road density than the action alternatives and this alternative would be expected to have more overall negative effects to watershed function due to roads than the other alternatives.

For this discussion, road miles within 300 feet of fish bearing streams would be considered an indicator of direct effects to fish habitat and fish populations. Under Alternative A, there would be 0 miles of closed road and 2.5 miles of open road within 300 feet of fish bearing streams on BLM lands. Under the action alternatives, there would be 0.5 miles of closed road and 2 miles of open road adjacent to fish bearing streams. Of the 2.5 miles of open roads adjacent to fish bearing streams under Alternative A, 2.1 miles would be adjacent to streams with westslope cutthroat trout (BLM sensitive species). In this context, Alternative A would have more potential long-term negative impacts to westslope cutthroat trout as well as to all fish species compared to the action alternatives.

Perennial non-fish bearing streams contribute to fish habitat indirectly by serving as conduits for watershed products (water, sediment, nutrients, contaminants, and in some cases woody material) to fish bearing streams. Under Alternative A, there would be 0 miles of closed road and 7.7 miles of open road within 300 feet of non-fish bearing streams on BLM lands in the TPA. Under all action alternatives there would be 3.2 miles of closed

road and 4.5 miles of open road in these areas. Alternative A would have more miles of open roads adjacent to perennial streams and would have more adverse effects to fish and aquatic habitat than the action alternatives.

This alternative would have the greatest negative impacts to fish and aquatic resources from open roads.

Effects of Alternative B

Under Alternative B, Boulder/Jefferson City TPA would have substantially fewer open roads (27 miles) compared to Alternative A (60.5 miles). Alternative B would have more open roads than Alternative C (23.5 open miles) but less than Alternative D (38 open miles). In the context of watershed function, Alternative B would have approximately 863 acres in the low road density category, 2,377 acres in the moderate road density category, and 11,247 acres in the high road density category on BLM lands (**Table 4-80**). This would be 391 more acres in low road density, 24 acres more in moderate road density, and 415 acres less in high road density than Alternative A. These acreages would be the same for Alternatives C and D. This analysis does consider “decommissioned” roads, but does not consider “closed” roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative B there would be approximately 30 miles of closed roads that would remain open under Alternative A, an additional indication that Alternative B would pose less of an impact to fish habitat than Alternative A. Under Alternative B (and all action alternatives), there would be 0.5 miles of closed road and 2 miles of open road adjacent to fish bearing streams on BLM lands. Of the 2 miles of open roads adjacent to fish bearing streams, 1.6 miles would be adjacent to streams with westslope cutthroat trout (BLM sensitive species). Alternative B would have 0.5 fewer miles of open road adjacent to fish bearing streams including streams with westslope cutthroat trout than Alternative A. This alternative would have fewer direct and indirect long-term negative effects to westslope cutthroat trout as well as other fish species than Alternative A.

Alternative B would also have fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams compared than Alternative A. Under Alternative B there would be 3.2 miles of closed road and 4.5 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. All 7.7 of these road miles would remain open under Alternative A so Alternative B would have fewer impacts to fish and aquatic habitat than Alternative A from these roads.

This alternative would have fewer negative effects to fish (including special status species) and aquatic resources from open roads than Alternative A.

Effects of Alternative C

Under Alternative C, the Boulder/Jefferson City TPA would have substantially fewer open roads (23.5 miles) compared to Alternative A (60.5 miles) and Alternative D (38 miles). Alternative C also would have fewer miles of open roads than Alternative B (27.3 open miles).

In the context of watershed function, Alternative C would have the same acreages in the low, moderate, and high road density categories on BLM lands as Alternative B (**Table 4-80**). This analysis does consider “decommissioned” roads, but does not consider “closed” roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative C there would be approximately 34 miles of closed roads that would remain open under Alternative A, and approximately 4 more miles of closed road than under Alternative B. Alternative C would pose slightly less impact to fish habitat than Alternative B, and would provide the greatest improvement to watershed function of all the alternatives. Effects associated with roads within 300 feet of fish bearing streams on BLM lands under Alternative C would be the same as under Alternative B. Effects associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands would be the same under Alternative C as under Alternative B. Alternatives C and B would have a similar degree of reduced negative effects to fish (including special status species) and aquatic resources from open roads than Alternative A. Alternative C would provide the greatest benefit to fish and aquatic habitats of all alternatives, having slightly greater benefits than Alternative B.

Effects of Alternative D

Under Alternative D, the Boulder/Jefferson City TPA would have substantially fewer open roads (38 miles) compared to Alternative A (60.5 miles). Alternative D, however, would have considerably more open road than Alternative B (27 open miles) and Alternative C (23.5 open miles).

In the context of watershed function, Alternative D would have the same acreages in the low, moderate, and high road density categories on BLM lands as Alternatives B and C (**Table 4-80**). This analysis does consider “decommissioned” roads, but does not consider “closed” roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen

sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative D there would be approximately 21 miles of closed roads that would remain open under Alternative A, and approximately 4 more miles of closed road than under Alternative B. Alternative C would pose slightly less impact to fish habitat than Alternative B, and would provide the greatest improvement to watershed function of all the alternatives. All action alternatives would have more acres with low road density (863) (based on open and closed roads), slightly more acres with moderate road density (2377) and fewer acres with high road density (11,247) than Alternative A. The action alternatives would be expected to have fewer overall negative effects to watershed function due to road than Alternative A. Even though Alternatives B and C show the same overall effects to watershed function as Alternative D, they would be expected to provide for better overall watershed function because they close more roads. Because Alternative D would close fewer roads, this alternative would be expected to have more negative watershed effects than Alternatives B and C. Alternative D would have more negative effects from roads on overall watershed function than Alternatives B and C but less than Alternative A.

Effects associated with roads within 300 feet of fish bearing streams on BLM lands under Alternative D would be the same as under Alternatives B and C. Alternative D would have more indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands than Alternatives B and C, but less than Alternative A. Under Alternative D, there would be 2.4 miles of closed road and 5.3 miles of open road in these areas.

This alternative would have more negative direct and indirect effects to fish and aquatic habitats and overall watershed function from open roads than Alternatives B and C. Alternative D would provide more benefits to fish and aquatic habitats than Alternative A.

Cumulative Effects on Fish

The Boulder/Jefferson City TPA supports a variety of native and introduced fish species. One of the major human influences to fish in the TPA has been the introduction of non-native trout species including rainbow trout, brook trout, brown trout throughout the TPA and also Yellowstone cutthroat trout into Cataract Creek. Rainbow trout have hybridized with the native westslope cutthroat trout in many streams, and brook trout and brown trout have displaced the native cutthroats in other streams, especially those altered by sedimentation and increased water temperatures brought on by human activities.

Human population growth for the upper Boulder Valley is approximately 2 percent per year. This rate of growth is expected to continue, along with increased

recreational use from local residents and area users (residents of Helena and Butte). Recreational activities in the Boulder/Jefferson City TPA include hunting, motorized OHV travel (motorcycles, ATVs, snowmobiles), and to a lesser extent, non-motorized uses (hiking, horseback riding, and mountain biking).

Development and urbanization can have substantial impacts to fish habitat and may pose the greatest threats to watershed function.

Agricultural activities from farming and ranching also contribute increases in nutrients, sedimentation and cause loss of aquatic habitats. Many streams in the TPA have been impacted by historic and on-going livestock grazing that breaks down streambanks, widens channels, removes vegetative cover, and causes an increase in fine sediment and nutrients.

The Boulder/Jefferson City TPA is within an area that was heavily impacted by historic mining and numerous drainages have been degraded by historic mining activities. See the Cumulative Effects discussion in the Water Resources section for a description of streams impacted by heavy metal contamination related to historic mining. There are five large mines which are no longer active and have had some level of reclamation by either the BLM or the State of Montana. These activities should gradually improve water quality and allow further recovery of fish populations, but full restoration could take decades to achieve. Montana Tunnels is the only active mine and continues to produce lead and zinc with associated gold and silver from an open pit. The mine is located near Jefferson City, and is approximately 1,500 acres in size (including 130 acres of BLM land). It is expected that exploration for minerals would continue in the future. Montana Tunnels is currently planning an expansion of the mine which would remove or degrade approximately 0.5 mile of Clancy Creek, a westslope cutthroat trout stream. Expansion of Montana Tunnels would create a barrier to westslope cutthroat trout in Clancy Creek as well as result in the loss of aquatic habitat.

Fires, floods, and drought have historically affected fish habitat in the TPA. These disturbances can cause a pulse of sediment or may temporarily reduce the quality of fish habitat in some watersheds while leaving other streams largely unaffected. Natural disturbances are typically followed by periods of stability during which fish habitats and populations recover. Population recovery in disturbed streams may be facilitated by fish immigration from nearby drainages less affected by the catastrophic event. In 2000, the Boulder Fire burned approximately 10,800 acres of the entire TPA and approximately 4,670 acres in the Decision Area. The fire did cause runoff and sedimentation as well as the loss of riparian vegetation to some streams.

After the 2000 Boulder Fire, approximately 560 acres of timber salvage occurred on BLM lands and a substantial

amount of acres on private lands were also heavily salvaged. This may have had substantial negative effects on riparian and aquatic habitats in the TPA. Additional timber harvest or vegetation restoration may occur on BLM lands in the future, especially within meadows that were not burned and are experiencing conifer encroachment. Vegetative treatments would be expected to be less under Alternatives A and C than Alternatives B and D.

Timber harvest can alter the recruitment of large woody debris, reduce canopy closures, and result in an increase in fine sediment to streams. Timber harvest along with associated roads can contribute substantially to the overall cumulative effects in forested watersheds. Between 1984 and 1995 only 260 acres of timber harvest occurred on BLM lands in the TPA although more occurred on adjacent private lands.

Roads are another major contributor of sediment to streams and a major problem with regards to cumulative watershed effects. Roads and trails can have localized effects on nearby stream segments or at stream crossing sites, especially fords. In some cases, effects are more extensive and may impair fish habitat for longer reaches of streams. Cumulatively, roads degrade aquatic habitat due to sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, loss of riparian vegetation, loss of large woody material and roads can cause changes in local fish populations when culverts are impassable and limit fish migration. Alternative A would have more negative cumulative effects to watersheds and individual streams due to roads than the action alternatives. Alternative B would have fewer negative cumulative effects than Alternatives A and D but more than Alternative C. Alternative B would improve overall watershed functions as well as improve habitat in individual streams more than Alternatives A and D but less than C. Alternative C would have the greatest beneficial cumulative effects.

SPECIAL STATUS PLANTS

Effects Common to All Alternatives

Ground-disturbing activities from road construction and maintenance, as well as road use by vehicles can affect special status plant populations and habitat. These activities can reduce sensitive plant species through disturbance to individual populations, increasing competition from invasive species, and reducing habitat connectivity. Closure of roads and trails can improve or maintain sensitive plant populations or habitat by reducing avenues of noxious weed spread, maintaining habitat connectivity, and improving pollinator habitat. Road and trail restrictions have the same effects but to a lesser degree.

Effects of the Alternatives

Under Alternative A, 60.5 miles of BLM roads and trails would remain open. The effects of these open routes would continue as described above in the Effects Common to All Alternatives section.

Under Alternative B, 3.7 miles of BLM roads and trails would remain open, 23.6 miles of roads and trails would be open with seasonal restrictions, 30.5 miles of roads and trails would be closed, and 2.7 miles of roads would be decommissioned. On the closed and decommissioned routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative B would benefit and reduce risk to special status plants compared to Alternative A.

Under Alternative C, 3.0 miles of BLM roads and trails would remain open, 20.5 miles of roads and trails would be open with seasonal restrictions, 34.2 miles of roads and trails would be closed, and 2.7 miles of roads would be decommissioned. On the closed and decommissioned routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative C would benefit and reduce risk to special status plants more than any other alternative because it would eliminate disturbance, vehicular use, and spread of noxious weeds on the most road miles.

Under Alternative D, 5.3 miles of BLM roads and trails would remain open, 32.8 miles of roads and trails would be open with seasonal restrictions, 20.6 miles of roads and trails would be closed, and 2.7 miles of roads would be decommissioned. On the open roads, effects would continue as described in the Effects Common to All Alternatives section above. On the closed and decommissioned routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative D would benefit and reduce risk to special status plants more than Alternative A, but would pose more risk than Alternatives B and C.

Cumulative Effects on Special Status Plants

Under all alternatives there are a number of past, present, and reasonably foreseeable future actions that affect special status plant populations.

Livestock grazing will continue in the area and has the potential to impact sensitive plant populations and habitat. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain

sensitive species populations and habitat. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, sensitive plants would benefit from the reduced competition. Use of herbicides for noxious weed control could cause mortality to special status plants if individual plants are inadvertently sprayed.

Recent and anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will reduce sensitive plant species habitat and in some cases individual populations. Additionally, subdivisions have the potential to disrupt the connectivity of plant habitat and populations as well as disturbing or eliminating pollinators needed by sensitive species. Some sensitive species that require soil disturbance may benefit.

Timber sale activity disturbance can destroy or degrade sensitive plant habitat. On public lands, projects would be designed to avoid, mitigate, or enhance sensitive plant habitats. The disturbance associated with timber harvest activities does have the potential to increase noxious weed spread which degrades sensitive species habitat and individual plant populations.

The Boulder complex fires of 2000 burned parts of the High Ore, Boomerang, Spring Creek, and Amazon watersheds. The burn encouraged noxious and invasive weed spread in some areas. On the other hand, potential habitat for special status plants that was being overtopped by conifers was opened up and improved by the fire.

At the scale of the entire Boulder/Jefferson City TPA (all land ownerships), the BLM travel plan alternatives would have slightly variable contributions to cumulative effects on special status plants. Under Alternative A none of the roads in the TPA would be closed. Under Alternative B adverse effects on special status plants would be slightly reduced compared to Alternative A because 8.5 percent of all roads in the TPA would be closed or decommissioned. Alternative C would provide the most benefits of all alternatives as 9.4 percent of all roads in the TPA would be closed or decommissioned. Alternative D would provide slightly more benefits than Alternative A but slightly fewer benefits than either Alternatives B or C as 5.9 percent of all roads in the TPA would be closed or decommissioned. Because BLM lands make up only 24 percent of all lands in the TPA, activities on non-BLM lands would play a dominant role in determining status of special status plants.

WILDLAND FIRE MANAGEMENT

Travel planning alternatives were analyzed to determine whether they could result in impact on wildland fire management, causing change to any of the following indicators:

- Fire regime condition class (FRCC)
- Firefighter and public safety
- Reducing threat to Wildland Urban Interface (WUI)

Effects Common to All Alternatives

Public road access during the fire season provides opportunities for human-caused fires either due to catalytic converters on vehicles igniting dry vegetation, or due to some types of human activities. Roads that are closed to public access reduce the risk of human-caused fire starts in those areas.

Decommissioned roads and roads that are closed and not regularly maintained for navigability reduce access for fire suppression. Closed roads may become impassible due to vegetation regrowth, downfall of trees, or severe erosion. Some roads may be closed with earthen berms or fallen trees and would need to be physically manipulated to make them useable for vehicles again. These roads would extend firefighting response time and have negative impacts on efforts to reduce wildland fire threat to WUI areas and firefighter and public safety. In an emergency fire suppression situation, any navigable closed roads needed for fire suppression would be used immediately. Non-navigable closed roads could also be used if deemed to be needed for fire suppression, after needed improvements are made to make those roads useable. Planning and implementation of fuels reduction treatments could occur in association with closed roads if variances for temporary road use were to be allowed. Variances would be subject to internal BLM review.

In the context of fuels reduction projects, availability of open roads is important to facilitating fuels project location as well as increasing project feasibility and decreasing costs. Open roads also facilitate spread of noxious weeds by transporting weed seed on vehicles and their tires. Presence of large noxious weed populations could delay or cause fuels projects to be cost-prohibitive due to the fact that the weeds may have to be treated before and/or after the fuels treatment. Also, some applications of fuel treatments (e.g., prescribed fire) may promote the spread of some weeds. The presence of weeds and non-native species are indicators that FRCC has departed from historical conditions.

Noxious weeds and non-native invasive species are well established and spreading in the Boulder/Jefferson City TPA.

Effects of Alternative A

Under Alternative A, all BLM managed routes in the Boulder-Jefferson City travel planning area would continue to be managed as open yearlong (60.5 miles). Alternative A would allow for the greatest flexibility between alternatives for access for suppression purposes. Fuels project feasibility would be highest under this alternative. However, public access during the fire season would be the greatest under this alternative and would provide the most opportunities for human-caused fire starts.

The distribution of noxious weeds could be the greatest under Alternative A with the most open roads and noxious weeds already well established. This would contribute to reduced feasibility of fuels reduction projects more than under any other alternative.

Effects of Alternative B

Alternative B provides a more balanced approach towards travel management and should help reduce user conflicts. Under Alternative B, 27.3 miles of routes (3.7 miles open yearlong, 23.6 miles seasonally restricted) would be available for wheeled motorized use. Alternative B would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A due to the fact that access would be limited to 27.3 miles of road. Of the 33.2 miles of closed roads, 2.7 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-caused fires associated with motorized use would be limited compared to Alternative A, due to a 55 percent decrease in miles of road open to motorized public travel.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would be closed under this alternative, Alternative B should help reduce the spread of noxious weeds and may make fuels treatment more feasible than under Alternative A, reducing FRCC departure.

Effects of Alternative C

Alternative C would provide the least amount of motorized wheeled access among the action alternatives. Under Alternative C, 23.5 miles of routes would be available for wheeled motorized use (3.0 miles open yearlong, 20.5 miles seasonally restricted).

Alternative C would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down compared to both Alternatives A and B, due to the fact that access would be limited to 23.5 miles of road. Of the 37 miles of closed roads, 2.7 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-caused fires associated with motorized use would be the lowest of all alternatives, due to a 61 percent decrease in miles of road open to motorized public travel compared to

Alternative A. Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would be closed than under any other alternative, Alternative C should help reduce the spread of noxious weeds more than any other alternative, and may make fuels treatment more feasible, reducing FRCC departure.

Effects of Alternative D

Under alternative D, 5.3 miles of open routes would be available yearlong for wheeled motorized use and an additional 32.8 miles would be seasonally restricted routes. Of the 22.4 miles of closed roads, 2.7 miles would be decommissioned and would likely be unusable for fire suppression. Alternative D would be more flexible than Alternatives B and C, but would limit flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A. The risk of human-caused fires associated with motorized vehicle use would be reduced compared to Alternative A, but would be greater than under Alternatives B and C, due to a 37 percent decrease in open roads compared to Alternative A.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because an intermediate number of road miles would be closed under this alternative, Alternative D should help reduce the spread of noxious weeds and may make fuels treatments more feasible than Alternative A, but would promote more weed spread and potentially make projects less feasible than Alternatives B and C.

Cumulative Effects on Wildland Fire Management

Effects on wildland fire management associated with any of the BLM travel plan alternatives would be overshadowed by reasonably foreseeable uncharacteristic fire, continued fire suppression made necessary by WUI and intermingled landownership, and large-scale forest insect infestations and disease outbreaks that would continue for the planning period. BLM lands make up about 24 percent of all lands while BLM roads make up about 15.4 percent of all roads in the Boulder/Jefferson City TPA.

Revision of the Helena and Beaverhead-Deerlodge National Forest Plans could result in more or less treatment of adjacent areas. Because no decision has been made, the effects are not known. Wildland fire management, particularly where wildland fire use (management of naturally ignited wildland fires to achieve resource objectives) may occur on USFS lands, will be determined in the plan decision. BLM would need to coordinate with USFS on all wildland fire use actions and events. Wildland fire use on USFS lands could affect FRCC on BLM lands. USFS lands make up 23 percent of all lands in the Boulder/Jefferson City TPA so activities there would likely have a similar

degree of influence on future fire characteristics as activities on BLM lands (24 percent of all lands in TPA).

Decisions to increase the level of wildland fire use, prescribed fire, or open burning by the public could impact the BLM's ability to use wildland fire and prescribed fire due to air quality concerns and requirements. This could postpone or eliminate BLM fuel reductions or treatments to improve FRCC.

Access is a critical component of wildland fire suppression. In some cases, access to public lands is being reduced by adjacent landowners gating or closing roads, which could hamper wildland fire suppression efforts and pose a risk to public and firefighter safety. Reducing access would also increase the potential for larger fires to occur due to an increase in time needed to access a fire and control it. Time needed to move in crews would be extended, and the ability to effectively apply and place resources (e.g., engines, water tenders, etc.) would be limited.

Effects on wildland fire management, including FRCC and firefighter and public safety due to management accomplished by other landowners may affect wildland fire management on public lands. When activity fuels (such as logging slash) are not treated adequately, fuel hazard could increase on adjacent lands which could affect fire intensity and severity on public lands. When adjacent owners treat fuels or implement fire mitigation plans in the WUI, fires are easier to suppress and firefighter safety is increased. In the Boulder/Jefferson City TPA, activities on private lands (53 percent of all lands in TPA) would have more influence on future fire characteristics in the area overall than activities on BLM lands (24 percent of all lands in TPA).

Human population increases and subsequent residential development are likely to expand the WUI and could alter forest management, taking the emphasis off restoring historic composition and structure and focusing more on fuel reduction.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Effects Common to All Alternatives

Alternative-specific risks or impacts to cultural and paleontological resources are difficult to discern due to a lack of extensive site-specific knowledge about the presence of these resources in a given TPA. By designating open routes, limiting open-country travel, and closing some routes, inadvertent discovery of cultural and paleontological resources and vandalism to them is reduced. Higher road densities in a given area would allow greater access to more land on the average, but that does not imply greater amounts of vandalism, since the vehicles would remain on designated routes.

VISUAL RESOURCES

Effects Common to All Alternatives

Roads (temporary or permanent) may affect visual quality. Roads that remain open for public use may impact visual qualities where noticeable. The quantity of open roads would also influence sensitivity levels since with more open roads, more areas would generally be viewed by more members of the public. Closing or decommissioning roads would generally reduce effects to visual resources and reduce sensitivity levels because fewer members of the public would generally be accessing and viewing areas with closed roads.

Effects of the Alternatives

Under Alternative A, all 60.5 miles of BLM road would remain open, thereby providing for the greatest level of impact to visual resources of all alternatives.

Under Alternative B, there would be 27.3 miles of open road (including open with seasonal restrictions), 30.5 miles of closed road, and 2.7 miles of decommissioned road. Road closures and decommissioning under this alternative would reduce effects on visual resources compared to Alternative A.

Under Alternative C there would be 23.5 miles of open road, 34.2 miles of closed road, and 2.7 miles of decommissioned road. Alternative C would have fewer adverse effects and would improve visual resources the most of all alternatives.

Under Alternative D, there would be 38.1 miles of open road, 20.6 miles of closed road, and 2.7 miles of decommissioned road. Alternative D would improve visual resources compared to Alternative A, but would have more adverse effects than Alternatives B and C.

Cumulative Effects on Visual Resources

Under all alternatives, most activities on BLM lands would generally not adversely affect visual resources to unacceptable degrees because discretionary activities on BLM lands would be required to meet Visual Resource Management objectives within individual project areas.

As the entire Boulder/Jefferson City TPA is highly mineralized and has seen extensive mining activity in the past, this activity is likely to continue for the foreseeable future. Mining activity often has visually intrusive effects on the landscape. On BLM lands, the Montana Tunnels Mine near Jefferson City has adversely affected visual resources and will continue to do so for the foreseeable future. The permitted area for this mine is approximately 1,500 acres with 130 of those acres on BLM lands, but intrusive modification of the landscape has only occurred on a subset of these acres.

Activities on non-BLM lands, particularly activities near BLM lands associated with residential development, urbanization, additional mining, or vegetation

management, could have adverse cumulative effects on visual resources on BLM lands because BLM VRM objectives would obviously not apply to non-BLM activities.

LIVESTOCK GRAZING

Effects Common to All Alternatives

Roads and trails can potentially affect livestock grazing management. Roads and trails often act as avenues of noxious weed spread. Noxious and invasive weeds can reduce the quantity and quality of forage. Users of roads and trails can cause management problems for livestock permittees when they leave gates open at fences, vandalize range improvements, or harass livestock, either purposely or unintentionally.

Closure of roads and trails can improve or maintain the forage base by reducing vectors of noxious weed spread. Additionally, road and trail closures can reduce management conflicts. On the other hand, closures may increase permittees' time requirements if and when work has to be conducted with horses or afoot. Permittees could minimize effects of closed roads on grazing management time by seeking variances from the BLM for temporary use of specific closed roads.

Effects of the Alternatives

Under Alternative A, 60.5 miles of roads and trails would remain open. The effects would continue as described above.

All action alternatives would close or decommission more roads and trails than Alternative A. As more roads and trails are closed, noxious and invasive weed spread along with multiple user conflicts would be reduced. On the other hand, permittee management time may increase. Consequently, more effects as described under the Effects Common to All Alternatives section would occur under Alternative C (23.5 miles open during grazing season, 36.9 miles closed or decommissioned) than under any other alternative. Alternative B (27.3 miles open during grazing season, 33.2 miles closed or decommissioned) would produce fewer effects than Alternative C, but more than Alternative A or Alternative D (38.1 miles open during grazing season, 23.3 miles closed or decommissioned). Alternative D would have fewer effects than Alternatives B or C, but more than Alternative A.

Cumulative Effects on Livestock Grazing

Livestock grazing will continue in the area and has the potential to impact forage quality and quantity. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain forage quality and quantity. On private lands, livestock grazing is expected

to decline slowly as more ranch and farmland is subdivided.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, forage conditions would benefit.

The Boulder complex fires of 2000 burned parts of the High Ore, Boomerang, Spring Creek, and Amazon watersheds. The burn encouraged noxious and invasive weed spread in some areas. On the other hand, many grasslands were improved with the reduction of conifers. Forage production (for livestock and wildlife) increased substantially.

Because BLM lands make up only 24 percent of all lands in the Boulder/Jefferson City TPA, all of the BLM travel plan alternatives would have a minor contribution to cumulative effects on livestock grazing at the scale of the entire TPA.

MINERALS

Effects Common to All Alternatives

Road closures and decommissioning could affect access to locatable minerals in areas of moderate or high mineral potential. Operators would be required to seek travel variances from the BLM to use motor vehicles to conduct mineral exploration on closed roads, or to conduct exploration on seasonally restricted routes during the season of closure. Decommissioned roads could not be used for motorized exploration. Travel management provisions that require a permit or variance could result in reducing access to mining claims or interfere with the ability to conduct exploration work for some operators. Historic knowledge of mineralized areas associated with "closed" roads may be lost after long periods of time if no exploration occurs there. Additional costs and time could be required for exploration and development of mining projects associated with closed or decommissioned roads. Impacts of road closures or decommissioning in areas with low mineral potential would not be substantial to mineral development.

Effects of the Alternatives

All of the roads in the Boulder/Jefferson City TPA are located in areas rated as having high mineral potential by the Montana Bureau of Mines and Geology. Effects of the alternatives for the Boulder/Jefferson City TPA on access to mineralized areas are summarized in **Table 4-84**. Alternative A for the Boulder/Jefferson City TPA would not impact roads in mineralized areas as all roads would remain open yearlong under this alternative.

Alternative B would seasonally restrict access to 39 percent of these roads, close 50 percent of them, and decommission an additional 5 percent (**Table 4-84**). Alternative B would have more impacts than Alternative A.

Alternative C would seasonally restrict access to 34 percent of these roads, close 56 percent of them, and decommission an additional 5 percent (Table 4-84). Alternative C would have the most potential to affect access to mineralized areas than any of the other alternatives.

Alternative D would seasonally restrict access to 53 percent of these roads, close 34 percent of them, and decommission an additional 4 percent (Table 4-84). Alternative D would have more impacts than Alternative A, but less than Alternatives B and C.

Table 4-84 Analysis of Access to Mineral Potential Areas Boulder/Jefferson City TPA				
Mineral Potential	Open Miles (%)	Seasonally Restricted Miles (%)	Closed Miles (%)	Decom Miles (%)
Alternative A				
High	60.5 (100%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Moderate	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Low	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Total Miles = 60.5				
Alternative B				
High	3.7 (6%)	23.6 (39%)	30.5 (50%)	2.7 (5%)
Moderate	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Low to none	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Total Miles = 60.5				
Alternative C				
High	3.0 (5%)	20.5 (34%)	34.2 (56%)	2.7 (5%)
Moderate	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Low to none	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Total Miles = 60.5				
Alternative D				
High	5.3 (9%)	31.8 (53%)	20.6 (34%)	2.7 (4%)
Moderate	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Low to none	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Total Miles = 60.5				
Mineral Potential areas have been delineated by the Montana Bureau of Mines and Geology (MBMG)				

Cumulative Effects on Access to Mineralized Areas

No other past, present, or reasonably foreseeable future actions in the Boulder/Jefferson City TPA would adversely affect mineral availability or access.

RECREATION

Effects of travel plan alternatives on Recreation in the Boulder/Jefferson City TPA are described qualitatively below.

Effects of Alternative A

Under Alternative A, all BLM managed routes in the Boulder-Jefferson City travel planning area would continue to be managed as open yearlong (60.5 miles). No non-motorized routes or trails would be available under this alternative. Snowmobile use would continue to be managed as open to area-wide cross country travel as well as travel on all existing routes (during the season of use, 12/2-5/15, conditions permitting).

Effects of Alternative B

Alternative B would provide a more balanced approach towards travel management, and should help reduce user conflicts compared to Alternative A. Under Alternative B, 27.3 miles of routes (3.7 miles open yearlong, 23.6 miles seasonally restricted) would be available for wheeled motorized use.

Area-wide cross-country snowmobile use would be allowed, as well as travel on all existing routes during the season of use, 12/2-5/15, conditions permitting. Conflicts between cross-country skiers, snowshoers, and snowmobilers would be expected to continue or increase as a result.

Effects of Alternative C

Alternative C would provide the least amount of motorized wheeled access among the action alternatives. Under Alternative C, 23.5 miles of routes would be available for wheeled motorized use (3.0 open yearlong, 20.5 miles seasonally restricted). Closure and decommissioning of routes in the southwest corner of the TPA would help create a non-motorized use area. Snowmobile use would be restricted to designated routes only, during the season of use (12/2-5/15), snow conditions permitting; reducing conflicts between motorized and non-motorized winter users.

Effects of Alternative D

Alternative D would provide the highest level of motorized wheeled access among the action alternatives. Under Alternative D, 38.1 miles of routes would be available for wheeled motorized use (5.3 open yearlong, 20.5 miles seasonally restricted). Area wide cross-country snowmobile use would continue to be allowed,

as well as travel on all existing routes during the season of use (12/2-5/15), snow conditions permitting.

Cumulative Effects on Recreation

This area presents management challenges given the fragmented BLM ownership pattern and the lack legal access roads. Many of the currently open roads result from historic mining activities and are dead-end segments that do not provide loop riding opportunities. Alternative A would provide the greatest opportunities for motorized recreation given the miles of routes available to wheeled vehicles and that the entire area would remain open to snowmobile use during the winter season. Conflicts between motorized and non-motorized users especially during the hunting season would continue.

Alternative B would reduce wheeled motorized riding opportunities on BLM lands by about 55 percent while snowmobile uses would continue unaffected. These additional travel plan restrictions would help reduce recreation use conflicts and should improve non-motorized opportunities for hunting, horseback riding, mountain biking and hiking. Many of the roads proposed for closure under this alternative are primitive, not maintained, have no legal access through private lands, and are duplicative of other roads left open. Increased trends in resource uses such as greater mining activities and vegetative treatments would increase impacts on the natural qualities of the Recreation Opportunity Spectrum settings which are primarily roaded natural and roaded modified.

Alternative C would promote non-motorized opportunities to the greatest extent of all alternatives given the added road closures from travel management, Recreation Opportunity Spectrum settings, and mineral related stipulations. Big-game hunting opportunities for non-motorized users could be enhanced as conditions would be more favorable for elk retention on public lands.

Alternative D would provide the highest level of motorized wheeled access among the action alternatives. Potential for conflicts between motorized and non-motorized users especially during the hunting season would be higher than under Alternatives B and C.

TRAVEL MANAGEMENT AND ACCESS

Effects of Alternative A

Under Alternative A all BLM roads in the Boulder-Jefferson City TPA would continue to be managed as open yearlong (60.5 miles) (Table 4-85). This is about 90 percent more routes open yearlong than under the action alternatives and 37 percent more routes open to motorized use when considering both open routes and routes with seasonally restricted access. Non-motorized trails are not available, which would result in fewer recreation opportunities for non-motorized users.

Table 4-85
Boulder-Jefferson City TPA
Route Management Summary

Proposed Management	Total Miles			
	Alt A	Alt B	Alt C	Alt D
Wheeled motorized routes				
Open Yearlong	60.5	3.7	3.0	5.3
Seasonally Restricted	0	23.6	20.5	32.8
Closed	0	30.5	34.2	20.6
Decommissioned	0	2.7	2.7	2.7
Non-motorized trails ¹	0	33.2	36.9	2.4

¹ Non-motorized trails include all open, open/restricted, and closed routes.

Snowmobile use would continue to be managed as open to area-wide cross country use as well as use on all existing routes (during the season of use, 12/2-5/15, conditions permitting); providing the greatest opportunity for motorized winter use while providing the fewest opportunities for non-motorized winter recreation of all alternatives.

The extent of management activities and costs under Alternative A would be mixed. Less personnel time would be required to monitor travel compliance than under the action alternatives. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards) than under the action alternatives. Estimated costs for road/trail maintenance would be highest of all alternatives.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be minimal under this alternative, given the availability of motorized access.

Effects of Alternative B

Less than half the wheeled motorized routes would be open yearlong or seasonally restricted than are currently available in the Boulder-Jefferson City TPA (Table 4-85). With 33.2 miles of non-motorized trails, Alternative B would provide more opportunities for non-motorized users than Alternative A. The majority of open routes under Alternative B would be seasonally restricted with a 12/2-5/15 closure.

Area-wide cross-country snowmobile use, as well as travel on all existing routes during the season of use (12/2-5/15), conditions permitting would continue to be allowed in all the action alternatives. Conflicts between non-motorized users (cross-country skiers, snowshoers) and snowmobilers would be expected to continue or increase as a result.

The extent of management activities and costs under Alternative B would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards) than under

Alternative A. However, more effort would be required for public education and compliance than under Alternative A. Estimated costs for road/trail maintenance would be less than under Alternative A.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would increase under Alternative B compared to Alternative A.

Effects of Alternative C

Alternative C would have the least number of wheeled motorized routes open yearlong or seasonally restricted of all alternatives in the Boulder-Jefferson City TPA (Table 4-85) which would result in fewer opportunities for motorized users. Alternative C would have 61 percent fewer motorized miles than Alternative A, and 14 percent fewer miles than Alternative B.

Snowmobile use would be restricted to designated routes only, during the season of use (12/2-5/15), snow conditions permitting. This would likely reduce conflicts with non-motorized winter users (cross-country skiing, snowshoeing).

Closure and decommissioning of routes in the southwest corner of the Boulder-Jefferson City TPA would result in an increase in non-motorized opportunities under Alternative C. Alternative C would have 10 percent more miles of non-motorized trails than Alternative B. No non-motorized trails would exist under Alternative A.

The extent of management activities and costs under Alternative C would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards) than under any other alternative. However, more effort would be required for public education and compliance than under the other alternatives. Estimated costs for road/trail maintenance would be the lowest of the alternatives.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be the greatest under Alternative C of all the alternatives.

Effects of Alternative D

Alternative D would provide the highest level of motorized access of the action alternatives with 38.1 miles of open and seasonally restricted routes (Table 4-85). This would be 61 percent less than under Alternative A, but 28 and 38 percent more than under Alternatives B and C, respectively. Opportunities for motorized users in the Boulder-Jefferson City TPA would be greater under Alternative D than under Alternatives B and C, but less than under Alternative A.

Area-wide cross-country snowmobile use would continue to be allowed, as well as travel on all existing

routes during the season of use (12/2-5/15) conditions permitting.

The extent of management activities and costs under Alternative D would be mixed. Less personnel time would be required to monitor travel compliance than under Alternatives B and D, but more would be needed than under Alternative A. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards) than under Alternatives B and D, but less effort would be needed than under Alternative A. Estimated costs for road/trail maintenance would be higher than under the other action alternatives, but less than under Alternative A.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be greater under Alternative D than under Alternative A, but less than under Alternatives B and C.

Cumulative Effects on Travel Management and Access

Under all alternatives, there are a number of past, present, and reasonably foreseeable future BLM and non-BLM actions that could affect travel management and access in the Boulder/Jefferson City TPA.

The Boulder-Jefferson City TPA is located adjacent to the upper Boulder Valley. Human population growth for the upper Boulder Valley (Boulder town statistics) is approximately 2 percent per year. This rate of growth is expected to continue, along with increased recreational use from local residents as well as area users (residents of Helena, Townsend, Butte, etc.).

The small towns of Boulder (population 1,436) and Jefferson City (population 295) are located adjacent to the TPA. Although the rate of growth is low, increased urbanization and recreational use could lead to increased social conflict; between area residents and recreation users, and among recreational users themselves (motorized/non-motorized). These factors could lead to increased public demands to alter travel management to accommodate more, or less motorized use.

Recreational activities for this TPA include big game hunting, motorized OHV travel (motorcycles, ATVs, snowmobiles), and to a lesser extent, non-motorized uses (hiking, horseback riding, and mountain biking). Conflicts between non-motorized and motorized users could lead to increased public demands for either more, or less motorized use.

The TPA mainly provides habitat for big game. The entire area is considered winter range for elk while the lower elevations along the eastern half of the travel plan are winter range for mule deer. Concerns could lead to the need to restrict motorized use.

In some site specific cases, visual resource management may effect or restrict new road/trail construction.

Applications for right-of-way permits to access private property or for commercial development are likely to increase in the future. As a result, public access to BLM lands, via the rights-of-way, could increase as well.

Limits or reductions in the BLM's funding and ability to maintain designated routes could lead to an overall reduction in maintained open road miles.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuels reduction projects, could effect travel management. BLM forest management activities from 1984 to present include 690 acres of fire replanting, 559 acres of timber salvage, and 266 acres of timber harvest. Future activities may include approximately 650 acres of forest and woodland treatment (thinning, selective harvest). There are no wildland fire fuels reduction activities planned for this area at this time. Depending on the type and scope of project, effects could vary from temporary, short-term area/route closures, to new opportunities (new routes) for motorized or non-motorized access.

The TPA has a rich history of mining for lead, zinc, gold, copper, and silver. With the exception of the Montana Tunnels Mine, the remaining mines are no longer active. The Montana Tunnels Mine (located near Jefferson City) continues to produce lead and zinc with associated gold and silver from an open pit. Increases in mineral prices could lead to additional increased or renewed mining activity. Depending on the type and scope of mining activity, effects could vary from temporary, short-term area/route closures, to increased opportunities (new routes) for motorized or non-motorized access.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the TPA. Motorized activities play a large role in the distribution of noxious weeds. Concerns over the spread of noxious weeds may lead to public demands to impose motorized travel restrictions.

Motorized use on dirt roads and trails is a major contributor to soil erosion and stream sedimentation. These concerns may influence travel management, and result in fewer motorized opportunities.

Most illegal activities (trash dumping, drug use, underage alcohol use, unattended camp fires, vandalism, etc.) are directly associated with motorized use. Increases in illegal activity may lead to public demands to alter travel management and impose motorized travel or other restrictions (site specific management).

For perspective, BLM managed lands represent approximately 24 percent of the total travel planning area (60,418 total acres, 14,487 BLM acres); while BLM managed routes represent approximately 15.4 percent of the total routes available (392 total miles, 60.5 miles BLM roads/trails under Alternative A). Future travel management (for all agencies, nationwide) is likely to

lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, BLM routes available to motorized use in this TPA could experience increased use from displaced users, eventually leading to more concentrated use, increased resource impacts, and user conflicts. These impacts could lead to demands from motorized users for additional routes, and conversely, demands from non-motorized users for fewer routes.

Under all alternatives, increases in human population, urbanization, recreation use, user conflicts; and concerns for wildlife, noxious weed spread, soil erosion/water quality, and illegal activities may lead to increased demands to restrict motorized travel, particularly in the areas adjacent to Boulder and Jefferson City. Under Alternative A, these conflicts would likely increase. Under Alternative B these pressures would have less impact on travel management than under Alternatives A and D, due to the overall reduction in motorized opportunities and separation of motorized and non-motorized uses. Under Alternative C these pressures would have the least impact on travel management than under the other alternatives, due to the reduction in motorized opportunities. Alternative D would lessen conflicts associated with these pressures compared to Alternative A, but not as much as Alternatives B and C.

TRANSPORTATION FACILITIES

For the sake of this discussion, "open" roads include roads that are open yearlong as well as those that are open with seasonal restrictions.

Effects of Alternative A

Under Alternative A, the Boulder/Jefferson City TPA would have 60.5 miles of open roads and no motorized trails (Table 4-86).

Table 4-86 Boulder-Jefferson City TPA Route/Trail/Maintenance Costs				
Classification/ Cost	Alt A	Alt B	Alt C	Alt D
Miles of Open/ Restricted Roads	60.5	27.3	23.5	38.1
Motorized Trails	0	0	0	0
Annual Roads Maintenance	\$4,840	\$2,184	\$1,880	\$3,048
Annual Trails Maintenance	\$0	\$0	\$0	\$0
Periodic Road Stabilization	\$1,936	\$874	\$752	\$1,219
Periodic Trails Stabilization	\$0	\$0	\$0	\$0
Monitoring/ Compliance	\$3,025	\$1,365	\$1,175	\$1,905
Weed Control	\$908	\$410	\$353	\$572

Estimated costs for annual maintenance and stabilization of roads under Alternative A would be higher than under the action alternatives because of the increased number of roads. Estimated annual costs for monitoring and compliance, and weed control would also be higher under Alternative A than under the action alternatives.

Effects of Alternative B

Under Alternative B, the Boulder/Jefferson City TPA would have 27.3 miles of open and no motorized trails (Table 4-86). Estimated costs for annual maintenance and stabilization of roads under Alternative B would be less than under Alternatives A and D and more than under Alternative C due to the reduction in motorized access. Estimated annual costs for monitoring, compliance, and weed control would also be less than under Alternative A, and similar to Alternatives C and D.

Effects of Alternative C

Under Alternative C, the Boulder/Jefferson City TPA would have 23.5 miles of open roads and no motorized trails (Table 4-86). Estimated costs for annual maintenance and stabilization of roads under Alternative C would be the least of all the alternatives due to the least number of motorized routes. Estimated annual costs for monitoring, compliance and weed control would also be less than under the other alternatives.

Closing the southwest corner of the Boulder/Jefferson City TPA to motorized use and the entire TPA to cross-country snowmobile travel would result in an increase in transportation facility costs for additional signage and sign maintenance.

Effects of Alternative D

Under Alternative D, the Boulder/Jefferson City TPA would have 38.1 miles of open roads and no motorized trails (Table 4-86). Estimated costs for annual maintenance and periodic stabilization of roads under Alternative D would be greater than under Alternatives B and C, but less than under Alternative A. Estimated annual costs for monitoring, compliance and weed control would also be less under Alternative D than under Alternative A and more than under Alternatives B and C.

LANDS AND REALTY

Effects Common to All Alternatives

The Butte Field Office administers approximately 62 rights-of-way (ROW), and one Recreation and Public Purpose (R&PP) Lease within the boundaries of the Boulder/Jefferson City TPA, which encumber approximately 2,036 acres of BLM land (Table 4-87). Various types of road rights-of-way are the most common type of grant, accounting for 42 percent, or just

Type	Approximate Number	Approximate Acres
Roads	26	1,256
Power	11	682
Telephone	9	40
O&G Pipelines	2	7
Comm Sites	7	5
R&PP Lease	1	39
Other	7	7
Totals	63	2,036

under half of the total. Other types of authorized uses include: oil and gas pipelines, lines for electrical distribution and telephone facilities, communication sites, ditches, railroads, and mineral material sites.

Approximately three right-of-way applications for new facilities as well as amendments, assignments, renewals, or relinquishments of existing right-of-way grants are processed annually in the TPA. This would not vary by alternative.

The general trend of granting rights-of-way is expected to increase through the planning period as a result of increasing public demands. From a cumulative effects standpoint, development of adjacent federal, state and private land, increased recreational use and the trend of homeownership away from urban areas, coupled with traditional on-going uses, are all expected to require more guaranteed access involving public land, including BLM lands.

SPECIAL DESIGNATIONS

There would be no effects to any special designation areas such as Wild and Scenic Rivers, Wilderness Study Areas, or Areas of Critical Environmental Concern under any of the travel plan alternatives for the Boulder/Jefferson TPA.

UPPER BIG HOLE RIVER TPA

The Upper Big Hole River TPA is a relatively long, narrow shaped area (approximately 60 by 18 miles) located in the southwest portion of the Butte Field Office. This 357,275-acre TPA contains approximately 63,108 acres of BLM land. It includes BLM lands located along the north and south banks of the Upper Big Hole River as well as a large contiguous section located east of Interstate-15, near the town of Divide. A large contiguous section extends south from Divide to the town of Melrose and includes the Humbug Spires Primitive Area. There are approximately 165 miles of BLM roads, making up about 12.6 percent of the approximate total of 1,309 road miles in the TPA. The

majority of roads lie on private (540 miles) and Forest Service (459 miles) lands.

SOILS

Effects Common to All Alternatives

Road construction, use, and maintenance affect soils in a number of ways. Soils are often compacted by these activities. Soil compaction can lessen the amount of precipitation that can infiltrate into soil and increase runoff, erosion, and sedimentation – in turn decreasing soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.

Ground disturbance associated with road construction, use, and maintenance can result in erosion. Erosion affects soil/site stability and hydrologic function. Erosion and sedimentation can destabilize the surface and subsurface cohesion of the soil, resulting in soil loss from erosion sites. Loss of soil can impede or prevent establishment and development of vegetation communities.

Closing or decommissioning roads often leads to beneficial effects to soils through decreased site disturbance and re-establishment of vegetative cover on road surfaces. This tends to reduce soil erosion and stabilize soils. Decommissioning roads may in some cases entail ripping road surfaces to de-compact them, thus improving water infiltration, hydrologic function, and the ability of the treated area to revegetate more successfully.

Impacts to soils associated with site-specific travel plan alternatives were assessed based on the potential for soil erosion using the following erosion risk criteria:

- High – the area a route travels through has slopes greater than 30 percent gradient.
- Moderate – the area a route travels through has slopes ranging from 15 to 30 percent gradient; or, for granitic soils, slopes ranging from 0 to 30 percent gradient.
- Low – the area a route travels through has slopes ranging from 0 to 15 percent gradient and soils are not granitic in origin.
- Unrated – road mapping not available at time of erosion impact rating.

Effects of the Alternatives

The distribution of road miles by erosion risk category and by proposed road management category for all the alternatives is shown for the Upper Big Hole River TPA in **Table 4-88**. Roads in the “unrated” category were excluded from detailed consideration and are shown for the purpose of displaying the extent of lacking information.

Because much of the terrain in this TPA is gentle to moderate in slope, most of the BLM roads are in either the low or moderate erosion categories. Under current conditions (Alternative A) approximately 5.6 miles of open BLM roads are located in areas with high erosion risk, and 60.7 miles are in moderate erosion areas. Soil erosion would be reduced under Alternative B because

Table 4-88
BLM Road Miles in Soil Erosion Impact Categories by Alternative for the Upper Big Hole River TPA
(mileages are GIS-generated estimates)

Proposed Road Management	Erosion Risk Category	Alternative A	Alternative B	Alternative C	Alternative D
Open Road Miles (incl. Open w/restrictions)	High	5.6	2.4	2.4	2.4
	Moderate	60.7	25.2	14.6	38.1
	Low	81.4	50.2	40.8	60.3
	Other	10.2	3.1	3.2	3.0
Closed Road Miles	High	0	2.9	2.9	2.9
	Moderate	3.3	23.8	30.0	13.0
	Low	1.2	14.9	25.7	7.5
	Other	2.9	9.9	10.6	9.8
Decommissioned Road Miles	High	0	0.2	0.2	0.2
	Moderate	0	14.2	16.7	12.9
	Low	0	14.0	16.5	12.4
	Other	0	0.1	0.1	0.1

Note: Open roads include seasonally open roads as well as roads open yearlong.

this alternative would reduce those mileages in the high and moderate erosion categories to 2.4 miles and 25.2 miles, respectively. Approximately 26.7 miles of road in the high and moderate classes combined would be closed under Alternative B with an additional 14.4 miles in these categories being decommissioned. Vegetative recovery should occur to varying degrees on closed and decommissioned roads, with a beneficial effect on soils of reducing erosion from these areas.

Soil erosion would be reduced under Alternative C more than under any other alternative because the lowest mileage of roads in the high and moderate erosion categories would be left open (17.0 miles combined), while the greatest mileage in these categories would be closed (32.9 miles combined) of all alternatives. An additional 16.9 miles in these categories would be decommissioned under Alternative C, more than under any other alternative.

Soil erosion associated with roads would be reduced under Alternative D compared to Alternative A, but would still be higher than under either Alternative B or C. Approximately 40.5 miles of BLM road in the moderate and high erosion categories combined would remain open under Alternative D, while about 15.9 miles in these categories would be closed and 13.1 miles would be decommissioned under this alternative.

Cumulative Effects on Soils

Cumulative effects to soils in the Upper Big Hole River TPA would arise from a number of past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 357,275-acre TPA, BLM lands comprise about 63,108 acres or 18 percent of total lands. The approximately 165 miles of BLM roads make up about 13 percent of the approximately 1,309 road miles in the TPA. Therefore road-related effects to soils described by alternative for BLM roads would affect about 13 percent of all roads in the TPA. The majority of lands (and roads) within the TPA boundary are either private property or public lands administered by the Forest Service. Non-BLM roads are managed by the county, Forest Service, state, and private landowners.

Approximately 6,805 BLM acres are permitted for various rights-of-way and leases. About 2,907 of these acres are for specific road rights-of-way primarily to private landowners. An additional 2,986 acres are associated with railroads and road rights-of-way to the Forest Service. The remainders are associated with power lines, waterlines, communication sites, oil and gas pipelines and other utility facilities. Impacts to soils range from compaction and occupation of ground with buildings, roadbeds, and other facilities, to revegetation and ground cover being re-established to stabilize soils.

From 1984 to 1995, timber harvest occurred on approximately 57 acres of BLM lands in this TPA. An addition 189 BLM acres have undergone timber harvest from 1995 to the present. Most of this activity has been

selective harvest. Adverse effects on soils from these treatments were generally minor with treated areas having undergone revegetation and soil stabilization since treatment.

Approximately 430 acres of selective timber harvest is foreseeable on BLM lands over the next several years. This harvest would be located in Wildland Urban Interface areas where a mountain pine beetle epidemic is killing many lodgepole pine trees. Effects to soils from this project would likely be minor, possibly with localized areas of erosion or compaction. Timber harvest has also occurred on private and Forest Service lands and will likely continue for the foreseeable future, having localized compaction and erosion effects on soils.

From 1981 to 2004, wildland fire has burned across approximately 230 acres in the Upper Big Hole River TPA, having a range of soil effects with more severely burned areas experiencing localized erosion while less severely burned areas underwent relatively little effect to soils.

Over the past 10 years, approximately 474 acres of BLM land have undergone prescribed fire treatments while an additional 141 acres have undergone mechanical treatments. These treatments occurred in the Jerry Creek and Dickie Hills areas. Overall these projects generally had minor adverse effects on soils as treatment areas have revegetated and soils have stabilized. Within the next several years, BLM plans to implement 2,087 acres of mechanical treatment and 2,659 acres of prescribed fire with the Highland Mountain project in this TPA. BLM is currently planning an additional project to reduce fuels and restore vegetation communities on 500 to 2,000 acres with a combination of mechanical treatments and prescribed fire. These treatments would generally have minor adverse effects on soils. Prescribed burning would occur under conditions where fire severity and intensity would be low, thereby minimizing adverse effects to soils. All treatments would minimize compaction so as to promote vegetative recovery. Fuels treatments conducted on private and Forest Service lands will likely occur for the foreseeable future with variable effects to soils. Reducing fuels under the controlled conditions of deliberate treatments may benefit soils in the long-term by reducing the risk of high severity fires in treated areas.

Livestock grazing on public and private lands throughout much of the TPA has created areas of localized soil erosion and compaction, particularly in grassland and shrubland areas. This will continue to occur for the foreseeable future.

Increasing residential development will likely continue for the foreseeable future to variable degrees within the TPA. Erosion, compaction, and covering of soils would occur due to additional road construction,

clearing/leveling for home sites, and establishment of utility infrastructure for residential developments.

Under Alternative A, the contribution to cumulative effects on soils from BLM road management would continue as it occurs today. Retaining approximately 70 miles of road open yearlong and an additional 88 miles open with various seasonal restrictions would allow for the same level of compaction and erosion impacts that currently exist.

From a BLM road management perspective, all action alternatives would benefit soil resources compared to Alternative A. Alternative B would benefit soils by providing for a reduced contribution to adverse cumulative effects than would Alternative A because about 48 percent of BLM roads would be closed or decommissioned under Alternative B (compared to about 4 percent under Alternative A). Erosion should be reduced on these closed/decommissioned roads as disturbance is eliminated and soils stabilize.

Alternative C would benefit soils the most and provide for the least contribution to adverse cumulative effects on soils of all alternatives. This alternative would provide for closure or decommissioning of about 62 percent of BLM roads in the TPA, thus allowing these areas to vegetatively recover and stabilize soils.

Alternative D would provide for the greatest contribution to adverse cumulative effects on soils of the action alternatives, but would still provide for greater long-term benefits to soils than Alternative A. Alternative D would provide for closure or decommissioning (and therefore vegetative recovery and soil stabilization) of about 36 percent of BLM roads in the TPA, compared to 4 percent for Alternative A, 48 percent for Alternative B, and 62 percent for Alternative C.

Overall, due to the scattered distribution and relatively small proportion of BLM lands (18 percent) and roads (13 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on soils at the scale of the Upper Big Hole River TPA.

WATER RESOURCES

Effects Common to All Alternatives

There are a number of key concepts that are critical to understanding road effects to water resources.

Hydrologic function is an interaction between soil, water, and vegetation, and reflects the capacity of a site to:

- Capture, store, and safely release water from rainfall, runoff, and snowmelt;
- Resist a reduction in this capacity; and
- Recover this capacity following degradation.

Interception of precipitation results when precipitation falls on vegetation. When vegetation is removed, precipitation falls directly on the soil. This can increase surface erosion and sedimentation, and decrease the amount of time between initial precipitation arrival and peak surface runoff – in turn decreasing soil/site stability and hydrologic function. Roads remove vegetation and therefore decrease interception of precipitation.

Infiltration is the process of precipitation entering and traveling through soil. Infiltration reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. Infiltration also filters precipitation and reduces erosion and sedimentation. If infiltration is reduced, runoff and erosion will increase and hydrologic function will decrease. Generally, roads are compacted surfaces that have decreased infiltration, thus increasing runoff and potentially increasing erosion.

Runoff can affect the amount of erosion and sedimentation, as well as flooding – both onsite and offsite. If runoff is increased, all of these effects can increase with a result that water quality and hydrologic function will decrease.

Increased sediment entering waterbodies increases turbidity, increases width-to-depth ratios, and consequently increases temperature and dissolved oxygen saturation levels, and creates adverse habitat for aquatic animals and plants.

Alteration of flow routing can also affect water resources. For example, roadcuts into areas with relatively shallow groundwater can intercept groundwater, bring it to the surface, and transport it some distance (i.e. in a roadside ditch) before delivering it to a stream. This can lead to erosion of road ditchlines and subsequent sedimentation of streams during runoff periods, or increased thermal loading of water before delivery to streams during summer periods.

Closure and decommissioning of roads tend to reduce erosion and sedimentation effects stemming from roads on water quality. During road decommissioning, items such as compaction, drainage, stream crossing culverts, and ground cover are often addressed in a manner that markedly improves hydrologic function. These features are not fully addressed on roads that are merely “closed”, but closed roads often gradually revegetate so as to reduce erosion and sedimentation effects to water quality.

Effects of the Alternatives

Generally, road density is an indicator of overall watershed health and function. Watersheds with higher road densities tend to have lower water quality due to greater disruption of hydrologic function (described above), and potential for erosion and subsequent sedimentation. Road density also is related to the distribution and spread of noxious weeds. **Table 4-89**

Table 4-89
Acres of BLM Land in Road Density Categories by Alternative for the Upper Big Hole River TPA.

TPA Alternative	Road Density Category		
	Low (<1 mi/mi ²)	Moderate (1 to 2 mi/mi ²)	High (>2 mi/mi ²)
Alternative A	19,646	18,204	25,357
Alternative B	20,592	19,534	23,080
Alternative C	21,461	19,506	22,245
Alternative D	20,579	19,353	23,276

shows acres of BLM land in three road density categories by alternative for the Upper Big Hole River TPA. These data reflect any differences between alternatives based on roads proposed for “decommissioning” by alternative. While many “closed” roads would gradually contribute to increased hydrologic function over time, decommissioned roads would more directly contribute to hydrologic function because measures aimed at restoring hydrologic function would likely be part of the treatment during decommissioning. Alternative A would have the greatest amount of BLM land (25,357 acres) with “high” road densities of greater than 2 mi/mi². Alternative C would provide for the lowest acreage in the “high” category and the highest acreage in the “low” category of all alternatives. By this measure, Alternative C would benefit hydrologic function more than any other alternative, followed in sequence by Alternative B, then Alternative D. All action alternatives would improve hydrologic function compared to Alternative A.

Motorized routes within 300 feet of streams generally have greater potential to directly impact water quality through erosion and sedimentation, increased water temperatures (due to loss of shading vegetation), and direct alteration of stream channel morphology than those farther away. **Table 4-90** shows the miles of open and closed roads on BLM lands within 300 feet of streams by alternative. Under Alternative A there are about 7.9 miles of open road within 300 feet of fish bearing streams and 23 road miles within 300 feet of perennial non-fish bearing streams. Alternative C would provide for the greatest number of closed or decommissioned roads within 300 feet of streams of all

the alternatives (total of 10.7 miles). Alternative B would provide for the next greatest mileage (8.5 miles), followed by Alternative D (6.7 miles). By this measure, Alternative C would provide the greatest benefit to water resources of all the alternatives followed by Alternative B, then Alternative D. Each action alternative would reduce effects from roads in close proximity to streams and improve water resources compared to Alternative A.

There is a specific route that fords the Big Hole River to access the Sawlog Gulch area. Under Alternative A, continual unrestricted year-long motorized use of this route would cause the most water quality impacts of erosion and disturbance to the river bed at this site relative to any other alternative. These effects would be localized to tens to feet of river length. Under Alternative B this route would only be open for game retrieval during hunting season. This would reduce its usage and would reduce water quality and river bed disturbance effects at that site. Under Alternative C, this route would be closed yearlong thus eliminating water resource effects altogether. Under Alternative D the route would be closed from 12/2 to 7/15 to avoid use during winter and subsequent spring runoff periods. Alternative D would pose the greatest effects to water resources at this site of any of the action alternatives.

Cumulative Effects on Water Resources

Cumulative effects to soils in the Upper Big Hole River TPA would arise from a number of past, present, and reasonably foreseeable future actions on BLM lands as well as non-BLM lands. Within this 357,275-acre TPA, BLM lands comprise about 63,108 acres or 18 percent of

Table 4-90
Miles of Open and Closed Roads on BLM Lands within 300 ft. of Fish-Bearing Streams and Perennial, Non-Fish-Bearing Streams by Alternative for the Upper Big Hole River TPA.

	Perennial Fish-Bearing Streams		Perennial Non-Fish-Bearing Streams	
	# Open Road Miles	# Closed Road Miles	# Open Road Miles	# Closed Road Miles
Alternative A	7.9	0.1	23.0	0.8
Alternative B	7.6	0.4	15.7	8.1
Alternative C	6.7	1.3	14.4	9.4
Alternative D	7.6	0.4	17.5	6.3

Note: Open roads include seasonally open roads as well as roads open yearlong. Closed roads include decommissioned roads.

total lands. The approximately 165 miles of BLM roads make up about 13 percent of the approximately 1,309 road miles in the TPA. Therefore road-related effects to water resources described by alternative for BLM roads would relate to effects associated with about 13 percent of all roads in the TPA. There are approximately 276 miles of fish bearing stream and an additional 223 miles of perennial non-fish bearing stream in the TPA. On BLM lands there are about 19 miles of fish bearing stream and 41 miles of perennial non-fish bearing stream. The majority of lands (and roads) within the TPA boundary are either private property or public lands administered by the Forest Service. Non-BLM roads are managed by the county, Forest Service, state, and private landowners.

A number of the main access roads (non-BLM) in the TPA follow valley bottoms and parallel streams. State Highway 43 along the Big Hole River proper is among these valley bottom roads. Many of these roads are directly affecting stream channel or floodplain function by filling or impinging on stream channels or floodplains, precluding the presence of riparian vegetation (including large woody material in forested locations), producing sedimentation in streams (from road surfaces, ditchlines, winter "road sanding" operations) and potentially increasing thermal loading by lessening streamside shade. In smaller streams these effects are dominant in shaping stream channel and water quality conditions in many areas and will continue into the foreseeable future. Effects of Highway 43 on the Big Hole River are more localized and generally less severe than effects of valley bottom roads on smaller streams.

Approximately 6,805 BLM acres are permitted for various rights-of-way and leases. About 2,907 of these acres are for specific road rights-of-way primarily to private landowners. An additional 2,986 acres are associated with railroads and road rights-of-way to the Forest Service. The remainders are associated with powerlines, waterlines, communication sites, oil and gas pipelines and other utility facilities. Impacts to water resources are generally minor with some localized erosion and sedimentation and some contribution to decreased hydrologic function (decreased infiltration, increased runoff) due to compaction.

From 1984 to 1995, timber harvest occurred on approximately 57 acres of BLM lands in this TPA. An additional 189 BLM acres have undergone timber harvest from 1995 to the present. Most of this activity has been selective harvest. Adverse effects on water resources were minor from this activity. Approximately 430 acres of selective timber harvest is foreseeable on BLM lands over the next several years. This harvest would be located in Wildland Urban Interface areas where a mountain pine beetle epidemic is killing many lodgepole pine trees. Effects to water resources from this

project would likely be minor, possibly with localized areas of erosion and sedimentation.

Timber harvest has also occurred on private and Forest Service lands and will likely continue to have variable effects on water resources for the foreseeable future. Ground disturbance from these activities will have localized impacts to water resources including some sedimentation, loss of woody material recruitment for streams, and potential water temperature increases due to riparian shade loss.

From 1981 to 2004, wildland fire has burned across approximately 230 acres in the Upper Big Hole River TPA, having minor sedimentation effects on water resources.

Over the past 10 years, approximately 474 acres of BLM land have undergone prescribed fire treatments while an additional 141 acres have undergone mechanical treatments. These treatments occurred in the Jerry Creek and Dickie Hills areas. Overall these projects generally had minor adverse effects (erosion/sedimentation) on water resources. Within the next several years, BLM plans to implement 2,087 acres of mechanical treatment and 2,659 acres of prescribed fire with the Highland Mountain project in this TPA. BLM is currently planning an additional project to reduce fuels and restore vegetation communities on 500 to 2,000 acres with a combination of mechanical treatments and prescribed fire. These treatments would likely have minor adverse effects on water resources. Prescribed burning would occur under conditions where fire severity and intensity would be low so as to prevent scorching of soils and mortality of desirable vegetation. This should minimize erosion and sedimentation of water resources. All treatments would minimize compaction so as to retain hydrologic function. Fuels treatments conducted on private and Forest Service lands will also likely occur for the foreseeable future with variable effects to water resources. Effects of these treatments could be similar to timber harvest effects on these lands. Reducing fuels under the controlled conditions of deliberate treatments may benefit water resources in the long-term by reducing the risk of high severity fires that could have severe adverse water quality effects.

Increasing residential development will likely continue for the foreseeable future to some degree within the TPA, most notably in the Big Hole River valley bottom. Erosion, soil compaction, and runoff would likely increase due to additional road construction, clearing/leveling for home sites, and establishment of utility infrastructure for residential developments. Nutrient, chemical pollutant, and pathogen inputs to streams would also likely increase due to leaching from septic systems, urban runoff (fertilizer, chemicals, and petroleum pollutants), and waste from livestock.

Livestock grazing on public and private lands throughout much of the Upper Big Hole River TPA has

created areas of localized streambank trampling, soil erosion and compaction, and nutrient inputs to streams. In severe cases stream channel morphology may be altered due to severe loss of riparian vegetation, loss of streambank integrity, channel widening and shallowing, and substantial sediment inputs. These effects to water quality will continue to occur for the foreseeable future. Agricultural water withdrawals are a substantial impact to water resources in the Big Hole River itself. Government agencies and local entities regularly work with ranchers to minimize their agricultural withdrawals during summer low flow periods so as to minimize low flow effects on fish populations in the Big Hole River.

There are a number of streams identified as impaired on the MDEQ 303(d) list in the Upper Big Hole TPA. The Big Hole River itself (6.5 miles on BLM) is listed as impaired for heavy metal contamination, low flow alterations, physical habitat alterations, water temperature, and riparian vegetation alteration. Probable sources of impairment include irrigated crop production, mine tailings, abandoned mine lands, acid mine drainage, highways, channelization, riparian grazing, and streambank modification. These impacts will continue for the foreseeable future regardless of BLM road management in this TPA.

Camp Creek (1.8 miles on BLM) is listed as impaired for heavy metal contamination, sedimentation, low flow alterations and nutrient inputs with probable sources being riparian grazing, irrigated crop production, roads (valley bottom non-BLM road), and abandoned mine lands. Soap Gulch (5 miles on BLM) is impaired due to nutrient inputs, sedimentation, alteration of riparian vegetation with probable causes listed as riparian grazing, roads (valley bottom non-BLM road), and irrigated crop production. Though BLM does not manage the most impactful (valley bottom) road along Camp Creek, BLM does manage a considerable portion of the watersheds of both Soap Gulch and Camp Creek. BLM road management could make a considerable contribution to water resource conditions in these two streams. All three action alternatives (B, C, and D) would provide for the closure or decommissioning of some roads in each of these two drainages that would benefit water resources primarily by reducing sediment inputs. Alternative C would provide the most benefit, followed in sequence by Alternative B, then Alternative D.

Charcoal Gulch (1.3 miles on BLM) is impaired for nutrients and sedimentation with probable causes listed as riparian grazing and roads. Moose Creek (6 miles on BLM) is listed as impaired for low flow alterations due to irrigated crop production. Jerry Creek (0.4 mile on BLM) is impaired for alteration of riparian vegetation, excess algal growth, heavy metals, low flow alterations, and physical habitat alterations. Probable causes of impairment are listed as riparian grazing, abandoned mine lands, timber harvest, agriculture, irrigated crop

production, septic systems, and site clearance for land development. Deep Creek (0.9 mile on BLM) is listed as impaired for alteration of riparian vegetation, low flow alterations, and sedimentation. Probable causes are listed as streambank modification, irrigated crop production, and rangeland grazing. These impacts will continue for the foreseeable future. Impacts in these streams (except for Charcoal Gulch which has a valley bottom BLM road maintained in all alternatives), will continue for the foreseeable future regardless of BLM road management.

Overall, due to the scattered distribution and relatively small proportion of BLM lands (18 percent) and roads (13 percent) relative to the total quantities of lands and roads in the TPA, none of the BLM alternatives would substantially contribute to cumulative effects on water resources at the scale of the Upper Big Hole River TPA.

VEGETATIVE COMMUNITIES – FOREST RESOURCES AND FOREST AND WOODLAND PRODUCTS

Effects of the Alternatives

Under all alternatives, existing roads and roads built to access timber and forest product sales on BLM lands may encourage timber harvest and forest product sales on adjacent lands, particularly where landowners and other agencies looking to improve economic efficiency or opportunities in the management on their lands.

In general, vegetative treatment contractors tend to bid more readily on projects in areas with vehicle access or valuable products. BLM often prioritizes forest vegetation management activities such as forest products and forest protection actions (e.g. wildfire suppression and forest insect and disease control) in similar areas.

Rehabilitation of roads (decommissioning and in some cases road closure) would revegetate currently unvegetated roadbeds, which would increase vegetation biomass production on the landscape through colonization of sites with grasses, forbs, shrubs, and trees. Increases in revegetated area would occur at a rate of approximately 1.5 to 3 acres per mile of rehabilitated road. Eventually rehabilitated roads would support plant communities consistent with site potentials which would help resist weed invasions. However, road closures and removals (decommissioning) could make vegetation management treatments more difficult and costly, thereby inhibiting proposed treatments, reducing public access for product use and removal, and potentially slowing fire detection and suppression.

Under Alternative A there would be no increase in project analysis and implementation costs. However, under Alternative B approximately 48 percent (79.9 miles) of BLM roads would be closed or decommissioned. Under Alternative C about 62 percent (102.8 miles) of roads would be closed or decommissioned, while under Alternative D about 36

percent (58.9 miles) of these roads would be closed or decommissioned. These closures would result in commensurate potential increases in vegetative analysis and treatment costs by alternative. These potential cost increases would be considered on a case by case basis by the BLM during project feasibility determinations, and additional funding may be needed to analyze and implement the projects that would remain feasible. Road closures could also result in potential decreases in quantities of forest products removed. Lack of road access could make small projects cost-prohibitive. Although temporary road building is still an option for access, slopes are generally steeper in the Upper Big Hole TPA as compared to other TPAs and may preclude road building. These limitations may increase the occurrence of helicopter logging and other non-traditional forms of product removal. Helicopters are a feasible access alternative in the Upper Big Hole TPA because forest products generally have higher value in this watershed and could absorb the increased cost of access. The extent of the road-related effects described above would be minimized because BLM would likely still be able to plan and implement projects in many areas on closed roads through the variance process for temporary road use. Road-related effects would be greatest under Alternative C, followed in sequence of decreasing effects by Alternative B, then Alternative D.

Roaded access to forested areas would also affect the gathering of firewood and other forest products by the general public. Most public parties prefer to drive close to areas of product removal so they do not have to carry products over long distances to their vehicles. Alternative A would have the greatest opportunity for firewood and other product removal with 70.6 miles of BLM road open yearlong and 88 additional miles open during summer. Alternative B would provide fewer opportunities than Alternative A with 21.1 miles of road open yearlong and 59.8 additional miles open during summer. Alternative C would provide the fewest opportunities of all alternatives with 19.2 miles of road open yearlong and an additional 40.8 miles open during summer. Alternative D (26.8 miles open yearlong, additional 70.6 miles open during summer) would provide more opportunities than Alternatives B and C, but fewer opportunities than Alternative A.

Cumulative Effects on Forest and Woodland Resources and Products

Forested vegetation in the Upper Big Hole TPA has been affected by past management on all land ownerships. Of the 63,108 acres of BLM owned land in the TPA, 246 were harvested since 1984. One hundred and twenty-six acres were also reforested. Currently, 430 acres are scheduled for insect control harvest in the Upper Big Hole TPA. Planning is also occurring on an additional approximately 1,000 BLM acres to implement forest restoration harvests and burning. Treatments will result in more open, healthier forest stands. Some temporary

roads and travel variances (to temporarily use closed roads) could be associated with these projects.

The Forest Service, with 143,778 acres in the TPA, also manages its forested resources through restoration projects including product removal and prescribed burning. These activities will likely continue in the future and promote healthier forest ecosystems in the planning area. Timber harvest will also continue on state and private ownerships, totaling 149,516 acres in the TPA.

The action alternatives could increase potential forested acreage by decommissioning roads and reclaiming approximately 64 acres under Alternative B, 75 acres under Alternative C, and 58 acres under Alternative D. Although miles of access would be decreased with road decommissioning, trees have the potential to colonize these areas and provide for forest products in the future.

Currently western spruce budworm, mountain pine beetle and Douglas-fir Beetle are present in forests within the Upper Big Hole TPA. These species are currently present at higher levels than experienced in the last twenty years and are resulting in widespread tree mortality. Endemic insect levels are expected to remain high in the future, with the bark beetle (mountain pine beetle and Douglas-fir Beetle) infestations peaking in the next several years. Even at lower population levels, these species can reduce forest health and individual tree vigor, sometimes resulting in tree mortality.

Forested vegetation in the Upper Big Hole TPA will also be affected by approximately 6,805 acres of rights-of-way and leases on BLM land. Forested vegetation located in these areas usually is harvested to accommodate the necessary access or facilities. Forest vegetation removal would occur on new authorizations in the future as necessary to maintain sight distances and safety clearances associated with roads and facilities.

Urbanization is expected to continue on the 115,567 acres of private land (28 percent of total acres) within the Upper Big Hole TPA. Forest products are commonly removed from these areas prior to permanent construction. Urbanization is likely to continue in the future and will affect forested vegetation at an unknown rate. As private construction increases, miles of road on private will most likely increase from the current 540 miles (41 percent of total in TPA).

Risk to forests from human-caused wildfires is commonly associated with open roads. Risk to forests from wildfire is greatest under Alternative A with 159 miles of BLM road open during the summer. Alternative B would have less risk of human-caused fire starts with about 81 miles of road open during summer. Alternative C would have the least risk to public forests with only 60 miles of road open during summer months. Alternative D (about 97 miles of road open during summer) would have more risk than either Alternatives B or C, but less risk than Alternative A. Given that the majority of roads

in the TPA (87.4 percent) are non-BLM roads, this contribution to reduced fire risk from BLM roads under the action alternatives is relatively small in the context of the entire TPA.

Since BLM roads constitute only 12.6 percent of all roads in this TPA, and BLM lands make up only 17.7 percent of all lands in the TPA, urbanization and activities on open non-BLM roads in the vicinity may have more cumulative effects on forested vegetation in the TPA than BLM decisions regarding miles of open and closed road.

VEGETATIVE COMMUNITIES – NOXIOUS WEEDS

Under all alternatives, any snowmobile use would have negligible effects on noxious weed spread and populations. Invasive noxious weeds and non-native species are degrading wildland health. These are aggressive plants that can outcompete many native plants, as they have few natural enemies to keep them from dominating an ecosystem. These plant species are spread by many means. However, any land disturbing activity in the TPA has the most potential to introduce and spread weed species. Motorized vehicles are one vector for noxious weed spread as weed seed becomes attached to vehicles and their tires, and are transported from one area to another where seeds become detached and germinate to inhabit new areas.

Effects of Alternative A

Under Alternative A, all BLM routes located within the TPA would continue to be managed as indicated on the Southwest Montana Interagency Visitor/Travel Map (interagency cooperative mapping effort, 1996 revision). Alternative A would provide 158.6 miles of routes open to wheeled motorized use (70.6 miles open yearlong, 88.0 miles seasonally restricted and 7.4 miles closed). Where allowed, snowmobile use would continue to be open to area-wide cross-country use as well as use on existing routes, during the season of use, 12/2-5/15, conditions permitting. Alternative A would have the most roads open and in turn would promote the greatest amount of weeds and other undesirable plant spread and production. More herbicide control would be needed to control weeds under Alternative A than under the other alternatives. Under Alternative A the open BLM road miles would make up about 12.6 percent of all open roads in the Upper Big Hole River TPA.

Effects of Alternative B

Under Alternative B, 80.9 miles of routes would be available for wheeled motorized use (21.1 miles open yearlong, 59.8 miles seasonally restricted). Snowmobile management would continue to remain substantially in effect as represented by the 1996 Southwest Interagency Visitor/Travel Map. This alternative would close 51.4 miles of road leaving 21.1 miles open yearlong as

compared to 69.9 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on these closed routes, but would increase spread on the open routes because of more concentrated use of these routes. Overall Alternative B would reduce weed spread, but would increase weed treatment costs per road mile on the remaining open roads compared to Alternative A. Under Alternative B, the 80.9 miles of open BLM road would make up about 6.2 percent of all open roads in the TPA.

Effects of Alternative C

Under Alternative C, 60.0 miles of routes would be available for wheeled motorized use (19.2 miles open yearlong, 40.8 miles seasonally restricted). This alternative would close 69.3 miles of road leaving 19.2 miles open yearlong as compared to 69.9 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on the closed routes, but would increase spread on the open routes because of more concentrated use of these routes. Overall Alternative C would reduce weed spread more than any other alternative, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. Under Alternative C, the 60 miles of open BLM road would make up about 4.6 percent of all open roads in the Upper Big Hole River TPA.

Effects of Alternative D

Under Alternative D, 97.4 miles of routes would be available for wheeled motorized use (26.8 miles open yearlong, 70.6 miles seasonally restricted). This alternative would close 33.2 miles of road leaving 26.8 miles open yearlong as compared to 69.9 miles of road open yearlong for Alternative A. This would prevent weed spread caused by motorized vehicles on the closed routes, but would increase weed spread on the open routes because of more concentrated use of these routes. Overall Alternative D would reduce weed spread more than Alternative A but less than Alternatives B or C, but would increase weed treatment costs per road mile on the remaining open road miles compared to Alternative A. Under Alternative D, the 97.4 miles of open BLM road would make up about 7.4 percent of all open road miles in the TPA.

Cumulative Effects on Noxious Weeds

Under all alternatives, other past, present, and reasonably foreseeable future actions on BLM and non-BLM lands will affect noxious weeds.

Recreation use is well established in the TPA, with fishing and big game hunting topping the list. The Big Hole River has a national reputation as a premiere fly fishing destination. Big game hunting attracts regional and national attention as well. Motorized recreation uses are one of the leading causes of introduction and spread

of noxious weeds and non native species. Weed seeds are transported by many recreational vectors i.e. water recreation uses, motorized vehicles including their tires, non-motorized vehicles including their tires, pack animals, and humans.

Applications for right-of-way permits on public lands to access private property or for commercial development are likely to increase in the future. As a result, soil disturbing activities (i.e. roads, powerlines, telephone lines, etc.), will likely increase, causing weeds to increase.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire fuels reduction projects, could effect noxious weed management. There have been multiple fuels treatments in this area in the last 10 years. Treatments consisted of 474 acres of prescribed burning and 141 acres of mechanical treatments primarily in the Jerry Creek and Dickie Hills areas. There are fuels treatments planned by the BLM for this area, mainly in the general area south of Wise River and in the Highland Mountains area. The Highland Mountain project will consist of approximately 2,087 acres of mechanical treatment and 2,659 acres of prescribed fire treatment, implemented in 2007 through 2012. The Wise River project would consist of mechanical and/or prescribed burning treatments from 500 to 2,000 acres focused on the urban interface areas having the objective to restore ecosystem health and reduce fuels. Prescribed burning projects give the ground surface a fertilization effect and eliminate some plant competition for weedy species giving them a niche for establishment and expansion in some areas. Ground disturbing equipment could also transport noxious weed seed to these project sites. BLM implements weed control measures in the aftermath of such ground-disturbing activities so as to minimize noxious weed spread.

Wildland fires create good seed beds and supply nutrients for weed species introduction and production. From 1981 to 2004 there have been 18 wildland fires that burned approximately 230 acres. As with mechanical vegetation treatment projects, BLM implements weed control measures in the aftermath of wildland fires to minimize weed spread.

A portion of the TPA (especially the Soap Gulch and Camp Creek areas) is strongly mineralized and has undergone considerable mining in the past. Current activity is low. However, increases in mineral prices could lead to additional increased or renewed mining activity. Mining is a land disturbing activity and the activity itself and weed seed contaminated equipment that is used could promote weeds in the area. Reclamation of abandoned mine sites can disturb ground and promote weed spread as well. BLM implements weed control measures associated with this reclamation work to minimize weed spread.

Noxious weeds and non-native invasive species are well established and spreading in the area. Weed control activities by BLM and other entities, while often effective at reducing or minimizing weed spread and weed populations, can also lead to some weed spread. Herbicide spray equipment is driven through weed infestations and weed seeds as well as other weed vegetative parts are spread to other lands during and following treatment. This TPA has received about 150 to 200 acres of treatment over the last 6 years on BLM lands. Treatment has primarily been by herbicide. These weed treatments have varying success in killing undesirable plants, depending on many environmental parameters.

Timber sales have built-in stipulations for mitigating weed production and spread. However, with ground disturbance the potential exists for weed introduction to occur on these sites. Since 1995 there has been 189 acres of timber harvest and 126 acres of forest planting (replanted in 1998). Vehicular use associated with tree plantings could contribute to the spread of existing weeds on site. Herbicide treatment of existing weeds is coordinated with tree seedling planting locations and timing, so as to minimize the spread of noxious weeds. .

Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, BLM routes available to motorized use could experience increased use from displaced users, leading to more concentrated use and potentially increased weed spread.

The TPA includes important habitat for big game (elk, bighorn sheep). Noxious weed seeds are transported and spread by wildlife through their digestive system and by attaching to the animals themselves and then being released at a later time.

Livestock grazing on and off BLM lands also contributes to weed spread either through seed being spread or introduced by livestock themselves, or through vehicular uses needed to manage grazing operations.

The majority of the Upper Big Hole River TPA is characterized by undeveloped land (private homes/ranches; BLM, State, and USFS lands). Only about 2,000 people live in the area, many of them making their living by ranching and hay farming. Human population growth for the TPA is expected to remain relatively low. However, the area is experiencing some residential growth on land subdivided near the Big Hole River and as family ranches are sold to out-of-state investors/seasonal residents. Population growth and use of the TPA from the population centers of Butte and Dillon will in turn lead to more opportunities for weed spread and production.

The TPA is largely undeveloped. Several small communities (Divide, Dewey, and Wise River) are located within the TPA; while the communities of

Melrose and Wisdom lie just outside. Urbanization is unlikely to become a major issue for many years. However, use of the TPA by the residents living adjacent to or within this area is increasing and leads to an increase in weed spread and propagation.

About 12.6 percent of all the travel routes in the Upper Big Hole River TPA are located on BLM managed lands (under Alternative A). Because the majority of roads (87.4 percent) and lands (82.3 percent) in the TPA are non-BLM, activities in these areas play a stronger role than activities on BLM lands in determining the status of weed spread and weed populations overall.

VEGETATIVE COMMUNITIES – RIPARIAN VEGETATION

Effects Common to All Alternatives

This section focuses on effects to riparian vegetation. For additional discussion of effects to water quality and stream channels, see the Water Resources and Fish sections.

Roads in riparian areas constitute ground disturbance that can eliminate or preclude presence of native riparian vegetation. This ground disturbance and loss of riparian vegetation may facilitate erosion and sedimentation of streams. Roads may also interfere with natural stream channel functions by occupying floodplains or active stream channel margins (see Water Resources section for more discussion). Noxious weeds may dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation. Noxious weed seed can be spread into riparian areas by motor vehicles via open roads. Closure of roads and trails can improve or maintain riparian condition by reducing avenues of noxious weed spread, as well as allowing for bare area re-vegetation which filters sediment in addition to stabilizing banks in some areas. Road and trail restrictions have the same effects but to a lesser degree, because some traffic will inhibit vegetation growth and recovery.

As a means of comparing alternatives, **Table 4-91** depicts the miles of wheeled motorized routes that cross or are within 300 feet of streams or wet areas on BLM lands in the Upper Big Hole River TPA.

Table 4-91 Miles of Roads and Trails by Proposed Management Category within 300 feet of Streams (including intermittent streams) in the Upper Big Hole River Travel Planning Area				
Miles of Wheeled Motorized Routes	ALT A	ALT B	ALT C	ALT D
Open	32.0	19.3	19.3	22.2
Restricted	29.7	21.1	15.4	23.8
Closed	3.3	23.7	29.4	18.1

Under Alternative A, 32 miles of BLM roads and trails would remain open that cross or are within 300 feet of riparian areas, 29.7 miles of roads and trails would have seasonal restrictions, and 3.3 miles would be closed. The noxious weed spread, streambank, and sediment delivery effects would continue as described in the Effects Common to All Alternatives section for the open roads. The BLM roads and trails most affecting riparian conditions are along Soap Gulch, McLean Creek, Moose Creek, Bear Creek, Sawlog Gulch and Charcoal Gulch and all would remain open, although McLean Creek and Charcoal Gulch are open with seasonal travel restrictions.

Under Alternative B, 19.3 miles of roads and trails would remain open that cross or are within 300 feet of riparian areas, 21.1 miles of roads and trails would have restrictions, and 23.7 miles would be closed. The noxious weed spread, streambank, and sediment delivery effects would continue as described in the Effects Common to All Alternatives section for the open roads. The BLM roads and trails most affecting riparian conditions are along Soap Gulch, McLean Creek, Moose Creek, Bear Creek, and Charcoal Gulch and all would remain open, although McLean Creek and Charcoal Gulch are open with seasonal travel restrictions. Sawlog Gulch travel use would be restricted by game retrieval rules, reducing the number of vehicular crossings of the Big Hole River at this location compared to Alternative A. A number of other streams would benefit from road and trail closures posed by this alternative. Alternative B would provide benefits to riparian vegetation compared to Alternative A.

Under Alternative C, 19.3 miles of BLM roads and trails would remain open that cross or are within 300 feet of streams or wet areas, 15.4 miles of roads and trails would have seasonal restrictions, and 29.4 miles would be closed. Effects would be similar to Alternative B with regard to the roads and trails most affecting riparian conditions in Soap Gulch, McLean Creek, Moose Creek, Bear Creek, and Charcoal Gulch. However the Sawlog Gulch and Big Hole River crossing would be closed under this alternative. Riparian condition would improve most under this alternative compared to all other alternatives.

Under Alternative D, 22.2 miles of roads and trails would remain open that cross or are within 300 feet of streams or wet areas, 23.8 miles of roads and trails would have seasonal restrictions, and 18.1 miles would be closed. Effects would be similar to Alternatives B and C with regard to roads along Soap Gulch, McLean Creek, Moose Creek, Bear Creek, and Charcoal Gulch. Travel use along Sawlog Gulch and the Big Hole River crossing would be seasonally restricted under this alternative. Under Alternative D, riparian condition would experience fewer road and trail effects than under Alternative A, but more than under Alternatives B or C.

Cumulative Effects on Riparian Vegetation

Noxious weed spread, mining, roads and trails, logging operations, and livestock grazing have affected riparian resource conditions in all TPAs, including the Upper Big Hole River TPA. Some of these factors continue to cause riparian area degradation primarily through direct disturbance or loss of riparian vegetation. Ground disturbance and loss of riparian vegetation facilitate erosion and sedimentation of streams. In the case of noxious weeds, they usually dominate riparian vegetation communities after some type of disturbance (such as roads, livestock grazing, mining, etc.) has reduced native vegetation.

Anticipated subdivision growth on private lands, though anticipated to occur at a lower rate in the Upper Big Hole River TPA than in other TPAs, will lead to more road construction and maintenance. More roads and development will increase severity of runoff events which in turn will cause more sediment delivery to creeks and streams. The additional sediment is likely to affect the functioning condition of some riparian areas by causing streambeds to aggrade at unnatural rates. Streambanks may also be affected if road placements do not allow for natural stream movements or meanders.

Logging and forestry practices on public and private lands are subject to streamside management zone (SMZ) requirements designed to maintain water quality and riparian vegetation. The proposed Riparian Management Zones under Butte RMP Alternatives B and C would be wider than SMZs and activities in these areas would be designed to benefit riparian resources, thus providing more riparian protection and more targeted management of riparian vegetation in both forested and non-forested areas than under RMP Alternatives A and D. The disturbance associated with timber activities does have the potential to increase noxious weed spread which degrades riparian area function and health. On public lands noxious weed control is a standard feature of any ground disturbing activities whereas on private lands noxious weed control is variable.

Livestock grazing will continue in the area and has the potential to impact riparian resource conditions. On BLM lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain riparian vegetation health and vigor. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Riparian conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, riparian conditions would improve because of the streambank protection gained from shrubby root systems and

filtering capability of native riparian sedge and rush species.

In recent years, mitigation work has been completed to harden crossings and reduce sediment production on the roads along Camp Creek, Soap Gulch, McLean Creek, Moose Creek, Sawlog Gulch and Charcoal Gulch.

The LaMarche Creek fluvial Arctic grayling habitat enhancement project improved riparian condition along this stream by stabilizing banks and creating lateral bars.

The Big Hole Watershed group has completed a number of projects to improve livestock grazing, weed control, and irrigation practices on private land. Riparian conditions along the river have improved in a number of places as a result of increased flows later in the season.

A number of privately owned blocks of land were logged within the past 20 years. Riparian vegetation was removed at the time but has recovered to some degree since then.

Cumulative effects under all the action alternatives would be similar to Alternative A at the scale of the entire TPA. The additional road and trail closures and seasonal restrictions on BLM roads in the action alternatives may slightly offset the cumulative road and trail impacts associated with subdivision development and other lands uses taking place in the TPA as compared to Alternative A. Alternative D would contribute less to riparian vegetation benefits than Alternatives B and C, but would contribute more benefits than Alternative A. Alternative C would contribute the most benefits of all alternatives while Alternative B would contribute more benefits than either Alternatives A or B.

Overall, because BLM roads make up only 12.6 percent of all roads in the TPA (under Alternative A), and BLM lands make up 17.7 percent of all lands in the TPA, the contributions to riparian vegetation benefits associated with closing riparian roads on BLM lands under the action alternatives would be dominated by activities on other lands at the scale of the entire Upper Big Hole River TPA. Activities on private lands (32 percent of total acreage in TPA) and USFS lands (40 percent of total acreage in TPA) would play a substantial role in determining riparian conditions at the scale of the entire TPA.

WILDLIFE

Effects of Alternative A

Under Alternative A, the Upper Big Hole River TPA would have considerably more open roads (158 miles) compared to the action alternatives. Under Alternative A, elk winter range on BLM lands in the Upper Big Hole TPA would have a low road density (1.0 mi/mi²), but this would still be the highest actual road density compared to the action alternatives (**Table 4-92**). Roads can cause direct mortality to wildlife through road kill,

Table 4-92 Decision Area Road Densities (mi/mi²) within Elk Winter Range in the Upper Big Hole River Travel Planning Area by Alternative				
	Actual Road Density	Acres of Low Road Density	Acres of Moderate Road Density	Acres of High Road Density
Alternative A	1.0	28,511	10,886	11,128
Alternative B	0.3	35,033	10,068	5,423
Alternative C	0.3	35,618	9,876	5,082
Alternative D	0.4	32,875	11,844	5,804

Low Density = 0-1 mi/mi², Moderate Density = 1-2 mi/mi², High Density = >2 mi/mi²

prevent wildlife movement, create disturbance, cause the spread of noxious weeds, reduce habitat and cause habitat fragmentation on the landscape. Open roads typically increase the level of recreation adjacent to roads which can result in additional disturbance and displacement of wildlife species. Roads can also encourage the public to recreate in areas that had formerly been secluded. Permanent and temporary roads could negatively impact wildlife including special status species, particularly if roads are open during critical periods such as in lynx winter habitat and during the summer months within grizzly bear habitat.

Wildlife, including special status species, that are especially sensitive to roads in the TPA include (but are not limited to) elk, grizzly bear, lynx, wolverine and some raptors. The detrimental effects of open roads to wildlife under Alternative A would be greater than under any of the action alternatives. Under Alternative A, this TPA would have fewer acres of functional winter range (28,511 acres in low road density areas) compared to the action alternatives (**Table 4-92**). Alternative B would provide 35,033 acres of functional winter range, Alternative C would provide 35,618 acres, and Alternative D would provide 32,875 acres.

Under Alternatives A and D, approximately 31,607 acres of the Upper Big Hole TPA would be closed to snowmobiles with the remaining 31,600 acres open for cross country snowmobile use. Snowmobiling occurs in both the Decision and Planning Areas and the use of snowmobiles could have substantial negative effects to wintering big game and other wildlife species. Cross-country snowmobile use could lead to harassment of wildlife during the high stress winter season. This could cause individuals to leave an area (temporarily or permanently) and/or an increase in stress that could lead to mortality. Alternatives A and D would have more detrimental effects to wildlife from cross-country snowmobile use than Alternatives B and C.

In evaluating impacts of travel planning on elk and other big game species, it is important to consider impacts on security habitat. Elk security is the inherent protection allowing elk to remain in an area despite increases in stress or disturbance associated with the hunting season or other human activities. Security habitat includes

blocks of nonlinear forested habitats greater than 250 acres in size that are at least 0.5 mile from an open road. Security habitat should also consist of larger trees (greater than 8 inches DBH) with vegetation dense enough to hide an adult elk. Under Alternative A, there would be approximately 4,665 acres of functional security habitat for big game species. This is the fewest acres of security habitat of all alternatives. Alternative C would have the greatest acres of security habitat (6,813 acres) (**Table 4-93**).

Table 4-93 Decision Area Acres of Big Game Security Habitat in the Upper Big Hole River Travel Planning Area by Alternative				
	A	B	C	D
Upper Big Hole River TPA	4,665	5,296	6,813	5,258

Core areas are areas large enough for wildlife (especially animals with large home ranges such as carnivores and big game) to forage and reproduce. Subcore areas are areas that could act as stepping stones for wildlife as they move through the region. Nearly all lands in the entire TPA are within core or subcore habitat (254,176 acres). Under Alternative A, there would be 79,300 acres with low road density, 60,765 with moderate road density, and 114,111 with high road density in the TPA for all land ownerships. Alternatives A and D would have fewer acres with low road densities in core and subcore habitat at the landscape level compared to Alternatives B and C.

There are also a substantial number of acres on BLM lands that are considered core/subcore habitat, approximately 42,250 acres. Under Alternative A, there would be 22,784 acres with low road density, 8,124 with moderate road density but the majority of acres have high road density, 11,342 acres, for core and subcore habitat on BLM lands. Alternatives A and D would have considerable fewer acres with low road densities in core and subcore habitat on BLM lands compared to Alternatives B and C.

Wildlife corridors are areas of predicted movement within or between core and subcore areas. The Big Hole

Valley provides a critical corridor link from north to south and the east half of the TPA provides a corridor from the Highland Mountains to the Pintler/Pioneer Mountains. This corridor also provides local daily movements and seasonal movements between higher elevation summer range along the Continental Divide and lower elevation winter range.

Within the Upper Big Hole TPA there are approximately 16,803 acres identified as "high quality" wildlife movement corridors under all land ownerships. In high quality movement corridors under all alternatives there would be 4,981 acres with low road density, 5,009 acres with moderate road density and 6,813 acres of high road densities.

On BLM lands in the TPA there are 3,205 acres mapped as high quality movement corridors. BLM lands in high quality movement corridors under all alternatives would have 2,714 acres with low road density, 480 acres with moderate road density and only 11 acres with high road density.

Riparian areas provide crucial habitat and critical travel corridors for wildlife including special status species. Riparian areas also provide a refuge for native plants and animals in times of stress such as drought or fire. Roads in riparian areas can prevent use of these crucial areas by wildlife, limit use or cause loss of habitat. Under Alternative A there would be 32 miles of open roads in riparian areas.

Effects of Alternative B

Under Alternative B, the Upper Big Hole River TPA would have substantially fewer open roads (81 miles) compared to Alternative A (158 miles). Of the 81 miles of open roads, only 21.2 miles would be open year-round and the remaining 59.8 miles would be seasonally restricted. Alternative B would have more open roads than Alternative C (60 miles) but less than Alternative D (97 miles). Alternative B would decrease harassment to wildlife during all seasons of use, especially during the winter and spring, more than Alternatives A and D. This alternative would also improve habitat and reduce fragmentation more than Alternatives A and D but less than Alternative C.

Under Alternative B, the actual road density in elk winter range in the Upper Big Hole TPA would be 0.3 mi/mi², below the maximum of 1 mi/mi² recommended by MFWP in big game winter range. This is lower than the road density under Alternative A (1.0 mi/mi²), the same as Alternative C, and slightly lower than Alternative D (0.4 mi/mi²) (Table 4-92).

Under Alternative B, this TPA would have more acres of functional winter range (35,033 acres in low road density areas) compared to Alternative A (28,511 acres), a similar amount to Alternative C (35,681 acres), and more acres than Alternative D (32,875 acres) (Table 4-92). Alternative B would improve the quality and

quantity of winter range in the Upper Big Hole TPA compared to Alternatives A and D but would have slightly fewer beneficial effects to winter range than Alternative C.

Alternative B would reduce the acres open to cross country snowmobile use to 13,240 compared to 31,600 acres under Alternatives A and D. Alternative B would have the most acres closed to cross country snowmobile use (46,930 acres) and would have more acres limited to snowmobile use on existing roads (3,030 acres) than Alternatives A and D (0 acres). Alternative B would have fewer negative effects to big game and other wildlife species than Alternatives A and D but could have considerably more effects than Alternative C since all snowmobile use under Alternative C would be limited to open roads.

The amount of big game security habitat would be greater under all action alternatives compared to Alternative A, which would have 4,665 acres. Alternatives B and D would be nearly identical with 5,296 acres and 5,258 acres, respectively. Alternatives B and D would have fewer acres of functional security habitat compared to Alternative C (6,813 acres) (Table 4-93).

For all land ownerships, Alternative B would increase the acreage of core and subcore habitat with low road density to 84,430 acres, compared to 79,300 acres under Alternative A. Alternative B would also increase the acreage with moderate road density to 63,221 acres over Alternative A (60,765 acres), and would decrease the acreage with high road density to 106,524 acres compared to the 114,111 acres under Alternative A. Alternative B would improve core and subcore habitat across the landscape more than Alternatives A and D but less than Alternative C.

On BLM lands acres in core/subcore habitat, Alternative B would increase the acreage with low road density to 26,759 acres compared to the 22,784 acres under Alternative A. Alternative B would also increase acreage with moderate road density to 9,140 acres compared to Alternative A (8,124 acres), and would substantially reduce the acreage in high road density to 6,351 acres compared to the 11,342 acres under Alternative A. Alternative B would improve core and subcore habitat on BLM lands more than Alternatives A and D but less than Alternative C.

Effects associated with high quality wildlife movement corridors under Alternative B would be the same as under Alternative A.

Alternatives B and C would protect and restore substantially more riparian habitat than Alternative A by reducing the miles of open roads in riparian acres to 19.3 miles (from 32 under Alternative A). Alternatives B and C would also have less open roads in riparian habitats than Alternative D (22.2 miles). Alternatives B and C would allow for more breeding, foraging and hiding

habitat as well as improve more movement corridors for a wide variety of species than Alternatives A and D.

Effects of Alternative C

Under Alternative C, the Upper Big Hole River TPA would have substantially fewer open roads (60 miles) compared to Alternative A (158 miles). Of the 60 miles of open roads, only 19.2 miles would be open year-round and the remaining 40.8 miles would be seasonally restricted. Alternative C would also have fewer open roads than Alternative B (81 miles) and considerably less than Alternative D (97 miles). Alternative C would decrease harassment to wildlife during all seasons of use, especially during the winter and spring, more than all other alternatives. This alternative would also improve habitat and reduce fragmentation more than all other alternatives.

Effects associated with the average open road density in elk winter range under Alternative C would be the same as under Alternative B (Table 4-92). Under Alternative C, this TPA would have more acres of functional winter range (36,618 acres in low road density areas) compared to Alternative A (28,511 acres), more acres than a similar amount to Alternative B (35,033 acres), and more acres than Alternative D (32,875 acres) (Table 4-92). Alternative C would improve the quality and quantity of winter range in the Upper Big Hole TPA more than Alternatives A and D and would have slightly more beneficial effects to winter range than Alternative B.

Alternative C would have the fewest negative effects to big game and other wildlife species by closing the entire TPA to cross country snowmobile use. Snowmobile use on approximately 31,600 acres would be limited to use on open routes (14).

The amount of big game security habitat would be greater under all action alternatives compared to Alternative A which would have 4,665 acres. Alternative C would have 6,813 acres of security habitat, more acres than any other alternative. Alternatives B and D would be nearly identical with 5,296 and 5,258 acres of security habitat, respectively (Table 4-93).

For all land ownerships, Alternative C would increase the acreage of core and subcore habitat with low road density to 85,004 acres, compared to 84,430 acres under Alternative B and 79,300 acres under Alternative A. Alternatives C and B would have similar acreage with moderate road density (63,030 acres and 63,221 acres, respectively), which would be an increase in acreage compared to Alternative A (60,765 acres). Alternative C would decrease the acreage with high road density to 106,142 acres, which would be slightly less than Alternative B (106,524 acres) and substantially less than Alternative A (114,111 acres). Alternative C would improve core and subcore habitat across the landscape more than all other alternatives.

In core and subcore habitat on BLM lands, Alternative C would increase the acreage with low road density to 27,302 acres compared to Alternative B (26,759 acres) and Alternative A (22,784 acres). Alternative C would decrease acreage with moderate road density to 8,947 acres compared to Alternative B (9,140 acres) but would slightly increase acreage with moderate road density compared to Alternative A (8,124 acres). Alternative C would substantially reduce the acreage in high road density to 6,000 acres, compared to the 11,342 acres found under Alternative A. Alternative C would improve core and subcore habitat on BLM lands more than all other alternatives.

Effects associated with high quality wildlife movement corridors would be the same under Alternative C as under Alternative B.

Effects associated with roads in riparian areas under Alternative C would be the same as under Alternative B.

Effects of Alternative D

Under Alternative D, the Upper Big Hole River TPA would have substantially fewer open roads (97 miles) compared to Alternative A (158 miles). Of the 97 miles of open roads, 26.8 miles would be open year-round and the remaining 70.6 miles would be seasonally restricted. Alternative D would have substantially more open roads than Alternative B (81 miles) and Alternative C (60 miles). Alternative D would allow more harassment to wildlife during all seasons of use, especially during the winter and spring, than Alternative B and, especially, Alternative C. This alternative would also restore less habitat and allow more fragmentation than Alternatives B and C but would improve habitat and lessen fragmentation compared to Alternative A.

Under Alternative D, the actual road density in elk winter range in the Upper Big Hole TPA would be 0.4 mi/mi², below the maximum of 1 mi/mi² recommended by FWP in big game winter range (Table 4-92). This is lower than the road density under Alternative A (1.0 mi/mi²) but slightly more than Alternatives B and C (0.3 mi/mi²).

Under Alternative D, this TPA would have more acres of functional winter range (32,875 acres in low road density areas) compared to Alternative A (28,511 acres) but less than Alternative B (35,033 acres) and Alternative C (35,618 acres) (Table 4-92). Alternative D would improve the quality and quantity of winter range in the Upper Big Hole TPA compared to Alternative but would have fewer beneficial effects to winter range than Alternatives B and C.

Under Alternatives D and A, approximately 31,607 acres of the Upper Big Hole TPA would be closed to snowmobile use with the remaining 31,600 acres open for cross country snowmobile use. Alternatives D and A would have more detrimental effects to wildlife from

cross-country snowmobile use than Alternatives B and C.

The amount of big game security habitat would be greater under all action alternatives compared to Alternative A, which would have 4,665 acres. With 5,258 acres of security habitat, Alternative D would have fewer acres than Alternative C (6,813) and slightly fewer acres than Alternative B (5,296 acres) (**Table 4-93**). For all land ownerships, Alternative D would increase the acreage of core and subcore habitat with low road density to 82,317 acres compared to Alternative A (79,300 acres). This alternative would have fewer acres with low road density compared to Alternative B (84,430 acres) and Alternative C (85,004 acres). All action alternatives would increase acreage with moderate road density compared to Alternative A. Alternative D would have 64,613 acres with moderate road density while Alternative A would have 60,765 acres. Alternative D would reduce the acreage with high road density to 107,246 acres compared to Alternative A (114,111 acres), but would have more acres with high road density compared to Alternative B (106,524 acres) and Alternative C (106,142 acres). Alternative D would improve core and subcore habitat across the landscape more than Alternative A but less than Alternatives B and C.

In core and subcore habitat on BLM lands, Alternative D would increase the acreage with low road density to 24,812 acres compared to Alternative A (22,784 acres), but would have fewer acres with low road density compared to Alternative B (26,759 acres) and Alternative C (27,302 acres). Alternative D would increase the acreage with moderate road density (10,587 acres) over Alternative A (8,124 acres) and would also increase the number of these acres compared to Alternative B (9,140 acres) and Alternative C (8,947 acres). Alternative D would reduce the acreage with high road density to 6,850 acres compared to Alternative A (11,342), but would have considerably more acres with high road density compared to Alternative B (6,351 acres) and Alternative C (6,000 acres). Alternative D would improve core and subcore habitat on BLM lands more than Alternative A but considerably less than Alternatives B and C.

Effects associated with high quality wildlife movement corridors would be the same under Alternative D as under the other alternatives.

Alternative D would protect and restore substantially more riparian habitat than Alternative A by reducing the miles of open roads in riparian acres to 22.2 miles (from 32 under Alternative A). Alternative D would have more open roads in riparian habitats than Alternatives B and C (19.3 miles). Alternative D would allow for more breeding, foraging and hiding habitat as well as improve more movement corridors for a wide variety of species than Alternative A but less than Alternatives B and C.

Cumulative Effects on Wildlife

Wildlife habitat in the Upper Big Hole TPA has been affected by roads, historic and current mining, timber harvest, weed infestations, recreation, power line corridor development and communication sites.

The majority of the Upper Big Hole River TPA is characterized by undeveloped land (private homes/ranches; BLM, state, and USFS lands). Only about 2,000 people live in the area, many of them making their living by ranching and hay farming. Population growth for the TPA is expected to remain low. Several small communities (Divide, Dewey, and Wise River) are located within the TPA.

Recreation use is well established in the TPA, with fishing and big game hunting topping the list. The Big Hole River has a national reputation as a premiere fly fishing destination. Big game hunting attracts regional and national attention as well.

The amount of historic mining varies throughout the TPA. From Divide to the northwest, there is little mineralization and minimal impacts from historic mining. From Divide to the southeast through the Soap Gulch and Camp Creek drainages, there is a substantial amount of mineralization and historic mining. Current activity, however, is low but increases in mineral prices could lead to renewed mining activity.

In the TPA, there are 20 powerlines and one pipeline. There are no existing communication sites in the TPA and, in the future, communication sites on BLM lands would be restricted to existing sites. No future communication sites are expected in the TPA on BLM lands but they could occur on other public or private lands. There is the potential for future powerlines and pipelines to be built in this TPA.

There are approximately 70 rights-of-way (ROW) in the TPA and applications for ROW permits to access private property or for commercial development are likely to increase in the future. As a result, public access to BLM lands could increase. Fewer ROWs would be expected under Alternative A because more BLM roads would remain open under this alternative. Alternative B would be expected to have fewer ROWs than Alternative C but more than Alternatives A and D. Alternative C would be expected to have the most ROWs and, of the action alternatives, Alternative D would have the fewest.

Approximately 63 bighorn sheep were relocated to the Camp Creek and Soap Gulch drainages between 2000 and 2004. These efforts have increased sheep populations in these areas.

From 1981-2004 there have been 18 wildland fires that burned 230 acres of BLM lands (it is unknown how many acres burned in the entire TPA). Nine of the fires were identified as human-caused and these fires burned the majority of the BLM acres (229). There have been several vegetative treatments in the TPA in the last 10

years. On BLM lands, approximately 474 acres were burned with prescribed fire and another 141 acres were mechanically treated in the Jerry Creek and Dickie Hills areas to remove conifer encroachment into meadow habitat. Timber was harvested on approximately 60 acres of BLM land between 1984 and 1995 and from 1995 to present there has been timber harvest on approximately 200 acres of BLM lands. Timber harvest has also occurred on private and Forest Service lands.

Additional vegetative treatments on BLM lands, consisting of thinning dry Douglas fir and removing conifer encroachment from sagebrush and grasslands, are planned for the Highlands and Wise River areas. Approximately 2,660 acres are planned for prescribed fire in the Highlands and approximately 500-2,000 acres of mechanical and prescribed fire are planned in the Wise River area. These projects would likely improve wildlife habitat by restoring grassland, shrubland, and forest habitat conditions.

Vegetative treatments on BLM lands have had moderate effects to wildlife habitat in the TPA. While most vegetative treatments have improved habitat for wildlife, some old timber sale units have not recovered. Timber harvest on private lands and other public lands has also had minor to moderate effects to wildlife habitat in the TPA. Past mining activities on public and private lands in the Soap Gulch and Camp Creek areas has altered some areas of the landscape, although high quality habitat is still available for wildlife. Roads constructed to access mining claims, timber harvest and recreation activities are, most likely, having the most direct impact on wildlife in the TPA.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the TPA. Motorized activities play a large role in the distribution of noxious weeds. The cumulative effects of the spread of noxious weeds from open roads would be greater under Alternative A than all other alternatives. Alternative A would result in more wildlife habitat being lost or degraded due to noxious weed infestations compared to the action alternatives. Alternative B would have fewer open roads than Alternatives A and D resulting in fewer infestations of noxious weeds. Alternative C would close the most roads and would have the fewest cumulative effects from loss of habitat due to noxious weeds of all alternatives. Open roads and development adjacent to BLM lands and the substantial amount of public use this area receives would still allow for the spread of noxious weeds.

Public lands make-up 58 percent of the TPA and provide large blocks of habitat. However, open roads on BLM lands as well as on private lands (about 570 miles) and other public lands (about 574 miles) have reduced the quality of wildlife habitat within the TPA. Open roads in the TPA cause disturbance and harassment to wildlife during the breeding and wintering seasons along with fragmentation and loss of habitat in the TPA. Open

roads in the Planning Area would likely increase due to development and management of private lands, especially in the Big Hole Valley. Alternative A would have the greatest negative cumulative effects to wildlife and wildlife habitat from open roads with 158 miles of open roads. Alternative B would have fewer negative cumulative effects with 81 miles of open road than Alternatives A and D (97.4 miles), but more than Alternative C (60 miles).

Of the action alternatives, Alternative C would have the most beneficial cumulative effects by reducing habitat fragmentation, restoring habitat, and reducing disturbance during all seasons of use. Alternative B would be more beneficial than Alternatives A and D but less than Alternative C.

Historic and recent timber cutting, past mining activity and firewood gathering along open roads in the TPA may have reduced the amount of suitable snag habitat for cavity nesting species. Alternative A would allow a substantial amount of access to the area for firewood cutting that would continue to prevent snag recruitment for snag dependant species and minimize the amount of down woody material along open roads. Alternative B would protect more snag and down woody habitat from loss due to firewood cutting than Alternatives A and D but would protect less of this habitat type than Alternative C.

The Upper Big Hole TPA provides the most functional big game security habitat of the five TPAs being analyzed in this EIS. The large amount of public land allows for larger blocks of habitat away from roads. However, there would be less security habitat under Alternative A due to higher open road densities than under other alternatives. Alternatives B and C would provide the most security habitat for big game (5,296 and 6,813 acres, respectively) and Alternative D would provide a similar amount to Alternative B (5,258 acres). Security habitat would still be limited on private (unless closed to hunting) and other public lands. Under the action alternatives, the reduction of open roads during the hunting season would help mitigate for the loss of security habitat on adjacent lands.

Approximately 71 percent of the TPA is mapped as core and subcore habitat that is predominately Forest Service and BLM lands. Open roads has had some impact on the quality of core/subcore habitat and wildlife movement corridors in the TPA.

Habitat mapped as core and subcore habitat and wildlife movement corridors having high road densities would continue to be of lower value to wildlife under Alternative A. An increase in open roads in both the Decision and Planning Areas could result in a loss of core and subcore habitat under all alternatives but, especially, Alternative A. Although core/subcore habitat and wildlife movement corridors would continue to be impacted by development on private lands in the Big

Hole Valley, Alternatives B and C would allow more BLM lands to function as core/subcore habitat and wildlife movement corridors. Alternatives B and C would have fewer negative cumulative effects to core/subcore and wildlife habitat than Alternatives A and D.

The cumulative effects of high road densities would continue to negatively affect wildlife species during the breeding season more under Alternative A than under the action alternatives. Alternatives B and C would have the most beneficial cumulative effects to wildlife during the breeding season compared to Alternative D and, especially, Alternative A.

FISH

For the sake of this discussion, “open” roads include roads that are open with seasonal restrictions as well as roads that are open yearlong. Roads identified as “closed” within 300 feet of streams also include roads that would be “decommissioned” in these areas by alternative. Effects to water quality described in the Water Resources section would affect fish populations and fish habitat quality. Analyses described and tabulated in the Water Resources section are referred to in the context of effects to fish in the discussion below.

Effects of Alternative A

Under Alternative A, the Upper Big Hole TPA would have substantially more open roads (158 miles) compared to the action alternatives. Roads can have a wide range of effects on fish and fish habitat. These effects would include, but are not limited to, increased sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, conduits for noxious weeds, loss of riparian vegetation, potential decreases in stream shading that could lead to water temperature increases, loss of instream habitats, and changes in local fish populations when culverts are impassable and limit fish migration.

Watershed (or hydrologic) function can be used as an indicator of relative risk or impacts to fish habitat. To determine the effects on watershed functions, a moving windows analysis was conducted on BLM lands to look at the miles of roads that would be decommissioned and removed from the landscape for each alternative. During this analysis, it was assumed that even though closing roads would improve watershed function, closed roads would remain on the landscape and could still have negative impacts to water quality and prevent or impede the restoration of riparian vegetation. Under Alternative A, there would be 19,646 acres with low road density, 18,204 acres with moderate road density and 25,357 acre with high road density on BLM lands in this TPA (**Table 4-89**). Alternative A would have fewer acres with low road density and more acres with high road density than the action alternatives and this alternative

would be expected to have more overall negative effects to watershed function and fish habitat due to roads than the other alternatives.

For this discussion, road miles within 300 feet of fish bearing streams would be considered an indicator of direct effects to fish habitat and fish populations. Under Alternative A, there would be 0.1 miles of closed road and 7.9 miles of open road within 300 feet of fish bearing streams on BLM lands. Alternative A would have 0.3-1.2 fewer miles of closed roads than the action alternatives and 0.3-1.3 more miles of open roads adjacent to fish bearing streams than the action alternatives. Of the 8 miles of open road adjacent to fish bearing streams under Alternative A, 4.3 miles are along streams with BLM special status species (westslope cutthroat trout and Arctic grayling). Alternative A would have more long-term negative impacts to westslope cutthroat trout as well as to other fish species compared to the action alternatives.

Perennial non-fish bearing streams contribute to fish habitat indirectly by serving as conduits for watershed products (water, sediment, nutrients, contaminants, and in some cases woody material) to fish bearing streams. Under Alternative A, there would be 0.8 miles of closed road and 23 miles of open road within 300 feet of non-fish bearing streams on BLM lands in the TPA. Alternative A would have substantially more miles of open road adjacent to perennial streams than the action alternatives.

This alternative would have the greatest negative impacts to fish and aquatic resources from open roads of all the alternatives.

Effects of Alternative B

Under Alternative B, the Upper Big Hole TPA would have substantially fewer open roads (81 miles) compared to Alternative A (158 miles). Alternative B would have more open roads than Alternative C (60 open miles) but less than Alternative D (97 open miles).

In the context of watershed function, Alternative B would have approximately 946 more BLM acres in the low road density category, 1,330 more BLM acres in the moderate road density category, and 2,257 fewer BLM acres in the high road density category than Alternative A (**Table 4-89**). Alternative B would contribute to improved hydrologic function more than Alternative A. This analysis does consider “decommissioned” roads, but does not consider “closed” roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative B, there would be approximately 44 more miles of closed roads than under Alternative A, an additional indication that Alternative B would pose less impact to fish habitat than Alternative

A. Alternative B would have 0.4 miles of closed road and 7.6 miles of open road within 300 feet of fish bearing streams on BLM lands. Of the 7.6 miles of open roads, 4 miles would be adjacent to streams with special status species (westslope cutthroat trout and/or Arctic grayling). Alternative B would slightly reduce direct effects fish bearing streams (including streams with special status species) compared to Alternative A.

Alternative B would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams than Alternative A. Under Alternative B there would be 8.1 miles of closed road and 15.7 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. This would be approximately 7.3 more miles of closed roads in these areas than under Alternative A. Alternative B would have fewer road-related adverse effects to fish and aquatic habitats than Alternative A and would contribute to aquatic habitat improvement compared to the current condition.

Effects of Alternative C

Under Alternative C, the Upper Big Hole TPA would have substantially fewer open roads (60 miles) compared to Alternative A (158 miles). Alternative C would also have fewer open roads than Alternative B (81 open miles) and Alternative D (97 open miles).

In the context of watershed function, Alternative C would have 1,815 more BLM acres in the low road density category, 1,302 more BLM acres in the moderate road density category, and 3,112 fewer acres in the high road density category than Alternative A (Table 4-89). This alternative would have 869 more BLM acres in the low road density category, 28 fewer acres in the moderate road density category, and 835 fewer acres in the high road density category than Alternative B. This analysis does consider "decommissioned" roads, but does not consider "closed" roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. Under Alternative C there would be approximately 62 more miles of closed roads than under Alternative A, and approximately 19 more miles of closed road than under Alternative B. From the standpoint of watershed function, Alternative C would pose less impact to fish habitat than Alternative B, and would provide the greatest improvement to watershed function of all the alternatives. Alternative C would have more miles of closed roads (1.3) and fewer miles of open roads (6.7) within 300 feet of fish bearing streams on BLM lands than all other alternatives. Of the 6.7 miles of open road, 4.0 miles would be adjacent to streams with special status species (westslope cutthroat trout and/or Arctic grayling). Alternative C would reduce direct effects to fish bearing streams from roads

(including streams with special status species) more than all other alternatives.

Alternative C would contribute fewer indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams on BLM lands compared to all other alternatives. Under Alternative C there would be 9.4 miles of closed road and 14.4 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. This would be 8.6 more miles of closed road than Alternative A and 1.3 more miles of closed road than Alternative B in these areas.

Overall Alternative C would have fewer road-related adverse effects to fish and aquatic habitats than any of the alternatives and would contribute the most to aquatic habitat improvement compared to the current conditions.

Effects of Alternative D

Under Alternative D, the Upper Big Hole TPA would have substantially fewer open roads (97 miles) compared to Alternative A (158 miles). Alternative D would have considerably more open roads than Alternative B (81 open miles) and Alternative C (60 open miles).

In the context of watershed function, Alternative D would have 933 more acres in the low road density category, 1,149 more acres in the moderate road density category, and 2,081 fewer acres in the high road density category on BLM lands than Alternative A (Table 4-89). This alternative would have the second fewest BLM acres in the low and moderate road density categories, and the second most BLM acres in the high road density category of all the alternatives. This analysis does consider "decommissioned" roads, but does not consider "closed" roads as contributing to watershed function. Even though closed roads could still have adverse effects to aquatic habitats, these roads have more potential to become revegetated and lessen sedimentation and runoff, and restore riparian vegetation (thus contributing to improved fish habitat conditions) than open roads. The fewest road total road miles would be closed under Alternative D (33 closed miles) of the action alternatives (51 closed miles under Alternative B, 69 closed miles under Alternative C). Alternative D would improve watershed function more than Alternative A, but less than Alternatives B and C. Effects associated with roads within 300 feet of fish bearing streams on BLM lands under Alternative D would be the same as under Alternative B. Alternative D would contribute more indirect effects to fish habitat associated with roads within 300 feet of perennial non-fish bearing streams than Alternatives B and C, but less than Alternative A. Under Alternative D there would be 6.3 miles of closed road and 17.5 miles of open road within 300 feet of perennial non-fish bearing streams on BLM lands in the TPA. This would be 5.5 more miles of closed roads than under Alternative A, 1.8 fewer miles

of closed roads than Alternative B, and 3.1 fewer miles of closed roads than Alternative C in these areas.

Alternative D would have fewer road-related adverse effects to fish and aquatic habitats than Alternative A, but more than Alternatives B and C, and would contribute to aquatic habitat improvement compared to the current condition.

Cumulative Effects on Fish

The Upper Big Hole TPA supports a variety of native and introduced fish species. One of the major human influences to fish in the TPA has been the introduction of non-native trout species including rainbow trout, brook trout, and brown trout throughout the TPA as well as Yellowstone cutthroat trout in Moose Creek and Wise River. Rainbow trout have hybridized with the native westslope cutthroat trout in many streams. Brook trout and brown trout have displaced the native cutthroats in other streams, especially those altered by sedimentation and increased water temperatures brought on by human activities.

The majority of the Upper Big Hole River TPA is characterized by undeveloped land (private homes/ranches; BLM, State, and USFS lands). Only about 2,000 people live in the area, many of them making their living by ranching and hay farming. Population growth for the TPA is expected to remain low and the area will likely remain predominantly undeveloped for the foreseeable future.

Recreation use is well established in the TPA, with fishing and big game hunting topping the list. The Big Hole River has a national reputation as a premiere fly fishing destination primarily for rainbow and brown trout. Big game hunting attracts regional and national attention, as well.

Agricultural activities from farming and ranching can contribute increases in nutrients, sedimentation and cause the loss or degradation of aquatic habitats. Many streams in the TPA have been impacted by historic and on-going livestock grazing that breaks down streambanks, widens channels, removes vegetative cover and causes increases in fine sediment and nutrients.

Agricultural water withdrawals are a substantial impact to water resources in the Big Hole River itself. During late summer the Big Hole River typically experiences lower than natural flows, increased water temperatures, and algal blooms. These conditions are exacerbated by agricultural water withdrawals during this period. Government agencies and local entities regularly work with ranchers to minimize their agricultural withdrawals during summer low flow periods so as to minimize low flow effects on fish populations in the Big Hole River. In particular, concern about the population status of fluvial Arctic grayling have prompted stakeholders in the Big

Hole River to provide greater instream flows during low flow periods to benefit Arctic grayling and prevent a federal listing of this species under the Endangered Species Act.

The amount of historic mining varies throughout the TPA. From Divide to the northwest, there is little mineralization and minimal impacts from historic mining. From Divide to the southeast through the Soap Gulch and Camp Creek drainages, there is a substantial amount of mineralization and historic mining. Current activity, however, is low but increases in mineral prices could lead to renewed mining activity. Increases in mineral prices could lead to increased or renewed mining activity in the Soap Gulch and Camp Creek drainages. The impacts from historic mining on aquatic habitats have been concentrated in the Soap Gulch and Camp Creek areas. See the Cumulative Effects portion of the Water Resources section for a description of streams impacted with heavy metal contamination due to historic mining.

Fires, floods, and drought have historically affected fish habitat in the TPA. These disturbances can cause a pulse of sediment or may temporarily reduce the quality of fish habitat in some watersheds while leaving other streams largely unaffected. Population recovery in disturbed streams may be facilitated by fish immigration from nearby drainages less affected by the catastrophic event. From 1981-2004 there have been 18 wildland fires that burned 230 acres. Nine of the fires were identified as human-caused and these fires burned the majority of the acres (229). There have been several vegetative treatments in the TPA on BLM lands in the last 10 years. Approximately 474 acres were burned with prescribed fire and another 141 acres were mechanically treated in the Jerry Creek and Dickie Hills areas to remove conifer encroachment into meadow habitat. These activities had minimal effects on fish habitat.

Timber harvest can alter the recruitment of large woody material, reduce canopy closures and result in an increase in fine sediment to streams. Timber harvest along with associated roads can contribute substantially to the overall cumulative effects in forested watersheds. Approximately 60 acres of timber on BLM lands was harvested between 1984 and 1995 and from 1995 to present there have been approximately 200 acres of timber harvest. Adjacent private and Forest Service lands have also had a small amount of timber harvest in the past and additional harvest is expected in the future with a range of effects to fish and aquatic habitat.

Past vegetation treatments on BLM lands may have had minor to moderate effects to aquatic habitat in the TPA. While most vegetative treatments have improved overall watershed functions, some old timber sale units have not recovered and have removed riparian vegetation. Timber harvest on private lands and other public lands may have also had minor to moderate effects to fish and aquatic habitats in the TPA.

Additional vegetation treatments, consisting of thinning dry Douglas fir and removing conifer encroachment from sagebrush and grasslands, are planned for the Highlands and Wise River areas on BLM lands. Approximately 2,660 acres are planned for prescribed fire in the Highlands and approximately 500-2,000 acres of mechanical and prescribed fire are planned in the Wise River area. These treatments will likely have minimal effects to fish and aquatic habitat.

Roads are another major contributor of sediment to streams and a major problem with regards to cumulative watershed effects. Roads and trails can have localized effects on nearby stream segments or at stream crossing sites, especially fords. Cumulatively, roads degrade aquatic habitat due to sedimentation from road construction and vehicle use, increased runoff, changes in surface water and drainage patterns from stream crossings, loss of riparian vegetation, and loss of large woody material. Roads can cause changes in local fish populations when culverts are impassable and limit fish migration. Alternative A would have more negative cumulative effects to watersheds and individual streams due to roads than the action alternatives. Alternative B would have fewer negative cumulative effects than Alternatives A and D but more than Alternative C. Alternative B would improve overall watershed functions as well as improve habitat in individual streams more than Alternatives A and D but less than C. Alternative C would have the greatest beneficial cumulative effects.

SPECIAL STATUS PLANTS

Effects Common to All Alternatives

Ground-disturbing activities from road construction and maintenance, as well as road use by vehicles can affect special status plant populations and habitat. These activities can reduce sensitive plant species through disturbance to individual populations, increasing competition from invasive species, and reducing habitat connectivity. Closure of roads and trails can improve or maintain sensitive plant populations or habitat by reducing avenues of noxious weed spread, maintaining habitat connectivity, and improving pollinator habitat. Road and trail restrictions have the same effects but to a lesser degree.

Effects of the Alternatives

Under Alternative A, 70.6 miles of BLM roads and trails would remain open, 88.0 miles of roads and trails would be open with seasonal restrictions, and 7.4 miles of roads and trails would be closed. On the open roads, effects would continue as described in the Effects Common to All Alternatives section. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. Restricted routes have some positive impact because some possible noxious weed

spread is reduced; however the benefit isn't as large as closing or decommissioning a route.

Under Alternative B, 21.1 miles of BLM roads and trails would remain open, 59.8 miles of roads and trails would be open with seasonal restrictions, 51.4 miles of roads and trails would be closed, and 28.5 miles would be decommissioned. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative B would benefit and reduce risk to special status plants compared to Alternative A.

Under Alternative C, 19.2 miles of BLM roads and trails would remain open, 40.8 miles of roads and trails would be open with seasonal restrictions, 69.3 miles of roads and trails would be closed, and 33.5 miles would be decommissioned. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative C would benefit and reduce risk to special status plants the most of any alternative because it would eliminate disturbance, vehicular use, and spread of noxious weeds on the most road miles.

Under Alternative D, 26.8 miles of BLM roads and trails would remain open, 70.6 miles of roads and trails would be open with seasonal restrictions, 33.2 miles of roads and trails would be closed, and 25.7 miles would be decommissioned. On the open roads, effects would continue as described in the Effects Common to All Alternatives section. On the closed routes, vectors of noxious weed spread would be reduced and habitat connectivity and health would be improved for sensitive plants and their pollinators. The restricted roads would reduce weed spread a limited amount. Alternative D would benefit and reduce risk to special status plants more than Alternative A, but less than Alternatives B and C.

Cumulative Effects on Special Status Plants

Under all alternatives there are a number of past, present, and reasonably foreseeable future actions that affect special status plant populations.

Livestock grazing will continue in the area and has the potential to impact sensitive plant populations and habitat. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain sensitive species populations and habitat. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided. Conditions may improve or degrade as management changes.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, sensitive plants would benefit from the reduced competition. Use of herbicides for noxious weed control could cause mortality to special status plants if individual plants are inadvertently sprayed.

Although less residential development is anticipated in the Upper Big Hole River area than in other TPAs, recent and anticipated subdivision growth on private lands will lead to more road construction and maintenance. More roads and development will reduce sensitive plant species habitat and in some cases individual populations. Additionally, subdivisions have the potential to disrupt the connectivity of plant habitat and populations as well as disturbing or eliminating pollinators needed by sensitive species. Some sensitive species that require soil disturbance may benefit.

Timber sale activity disturbance can destroy or degrade sensitive plant habitat. On public lands, projects would be designed to avoid, mitigate, or enhance sensitive plant habitats. The disturbance associated with timber harvest activities does have the potential to increase noxious weed spread which degrades sensitive species habitat and individual plant populations.

Mine closures are planned, and have been completed, in the Soap Gulch and Camp Creek areas where sensitive plant habitat is present. Activities have been planned to minimize or eliminate surface disturbance in sensitive plant habitat, however some plant populations or habitat may be inadvertently disturbed.

The Big Hole Watershed group has completed a number of projects to improve livestock grazing, weed control, and irrigation practices on private land. Riparian conditions along the river have improved in a number of places as a result. Habitat for Idaho sedge would improve as well as it is a riparian species.

The BLM fuels reduction project now being planned for the Wise River area is not anticipated to have any adverse effects on special status plants. Treatments would be designed to minimize surface disturbance in sensitive plant habitat. Additionally, treatment would improve habitat in some areas by opening up parks and edges where trees have expanded into grassland soils and trees have thickened to the point of closing canopies.

At the scale of the entire Upper Big Hole River TPA (all land ownerships), the BLM travel plan alternatives would have slightly variable contributions to cumulative effects on special status plants. Under Alternative A less than 1 percent of all roads in the TPA would be closed. Under Alternative B adverse effects on special status plants would be slightly reduced compared to Alternative A because 6.1 percent of all roads in the TPA would be closed or decommissioned. Alternative C would provide the most benefits of all alternatives as 7.9

percent of all roads in the TPA would be closed or decommissioned. Alternative D would provide slightly more benefits than Alternative A but slightly fewer benefits than either Alternatives B or C as 4.5 percent of all roads in the TPA would be closed or decommissioned. Because BLM lands make up only 17.7 percent of all lands in the TPA, activities on non-BLM lands would play a dominant role in determining status of special status plants.

WILDLAND FIRE MANAGEMENT

Travel planning alternatives were analyzed to determine whether they could result in impact on wildland fire management, causing change to any of the following indicators:

- Fire regime condition class (FRCC)
- Firefighter and public safety
- Reducing threat to Wildland Urban Interface (WUI)

Effects Common to All Alternatives

Public road access during the fire season provides opportunities for human-caused fires either due to catalytic converters on vehicles igniting dry vegetation, or due to some types of human activities. Roads that are closed to public access reduce the risk of human-caused fire starts in those areas.

Decommissioned roads and roads that are closed and not regularly maintained for navigability reduce access for fire suppression. Closed roads may become impassible due to vegetation regrowth, downfall of trees, or severe erosion. Some roads may be closed with earthen berms or fallen trees and would need to be physically manipulated to make them useable for vehicles again. These roads would extend firefighting response time and have negative impacts on efforts to reduce wildland fire threat to WUI areas and firefighter and public safety. In an emergency fire suppression situation, any navigable closed roads needed for fire suppression would be used immediately. Non-navigable closed roads could also be used if deemed to be needed for fire suppression, after needed improvements are made to make those roads useable. Planning and implementation of fuels reduction treatments could occur in association with closed roads if variances for temporary road use were to be allowed. Variances would be subject to internal BLM review.

In the context of fuels reduction projects, availability of open roads is important to facilitating fuels project location as well as increasing project feasibility and decreasing costs. Open roads also facilitate spread of noxious weeds by transporting weed seed on vehicles and their tires. Presence of large noxious weed populations could delay or cause fuels projects to be cost-prohibitive due to the fact that the weeds may have to be treated before and/or after the fuels treatment.

Also, some applications of fuel treatments (e.g., prescribed fire) may promote the spread of some weeds. The presence of weeds and non-native species are indicators that FRCC has departed from historical conditions.

Noxious weeds and non-native invasive species are well established and spreading in the Upper Big Hole River TPA.

Effects of Alternative A

Under Alternative A, all BLM routes located within the TPA would continue to be managed as indicated on the Southwest Montana Interagency Visitor/Travel Map (interagency cooperative mapping effort, 1996 revision). Alternative A provides 157.9 miles of routes open to wheeled motorized use (69.9 miles open yearlong, 88.0 miles seasonally restricted). Alternative A would allow for the greatest flexibility between alternatives for access for suppression purposes. Fuels project feasibility would be highest under this alternative. However, public access during the fire season would be the greatest under this alternative and would provide the most opportunities for human-caused fire starts.

The distribution of noxious weeds could be the greatest under Alternative A with the most open roads and noxious weeds already well established. This would contribute to reduced feasibility of fuels reduction projects more than under any other alternative.

Effects of Alternative B

Under Alternative B, 80.9 miles of routes would be available for wheeled motorized use (21.1 miles open yearlong, 59.8 miles seasonally restricted). Alternative B would limit the flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A due to the fact that access would be limited to 80.9 miles of road. Of the 79.9 miles of closed roads, 28.5 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-caused fires from motorized use would be limited compared to Alternative A, due to a 44 percent decrease in miles of road open to motorized public travel.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would be closed than under Alternative A, Alternative B should help reduce the spread of noxious weeds, and may make fuels treatment more feasible than Alternative A, reducing FRCC departure.

Effects of Alternative C

Under Alternative C, 60.0 miles of routes would be available for wheeled motorized use (19.2 miles open yearlong, 40.8 miles seasonally restricted).

Alternative C would limit the flexibility for access for suppression purposes, and fuels project feasibility would

go down compared to both Alternatives A and B, due to the fact that access would be limited to 60 miles of road. Of the 102.8 miles of closed roads, 33.5 miles would be decommissioned and would likely be unusable for fire suppression. The risk of human-caused fires associated with motorized use would be the lowest of all alternatives, due to a 58 percent decrease in miles of road open to motorized public travel. However, this degree of reduced motorized access may promote more non-motorized users to a concentrated area, increasing the odds for a human-caused fire to occur by another ignition source.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because more roads would be closed than under any other alternative, Alternative C should help reduce the spread of noxious weeds more than any other alternative, and may make fuels treatment more feasible, reducing FRCC departure.

Effects of Alternative D

Under alternative D, 26.8 miles of open routes would be available yearlong for wheeled motorized use and 70.6 miles would be restricted seasonally. Of the 58.9 miles of closed roads, 25.7 miles would be decommissioned and would likely be unusable for fire suppression. Alternative D would be more flexible than Alternatives B and C but would limit flexibility for access for suppression purposes, and fuels project feasibility would go down compared to Alternative A. The risk of human-caused fires associated with motorized vehicle use would be reduced compared to Alternative A, but would be greater than under Alternatives B and C, due to a 31 percent decrease in open roads compared to Alternative A.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the area. Because an intermediate number of road miles would be closed under this alternative, Alternative D should help reduce the spread of noxious weeds and may make fuels treatment more feasible compared to Alternative A, but would promote more weed spread and potentially make projects less feasible than Alternatives B and C.

Cumulative Effects of Wildland Fire Management

Effects on wildland fire management associated with any of the BLM travel plan alternatives would be overshadowed by reasonably foreseeable uncharacteristic fire, continued fire suppression made necessary by WUI and intermingled landownership, and large-scale forest insect infestations and disease outbreaks that would continue for the planning period. BLM lands make up about 12.6 percent of all lands while BLM roads make up about 17.7 percent of all roads in the Upper Big Hole River TPA.

Revision of the Beaverhead-Deerlodge National Forest Plan could result in more or less treatment of adjacent areas. Because no decision has been made, the effects are not known. Wildland fire management, particularly where wildland fire use (management of naturally ignited wildland fires to achieve resource objectives) may occur on USFS lands, will be determined in the plan decision. BLM would need to coordinate with USFS on all wildland fire use actions and events. Wildland fire use on USFS lands could affect FRCC on BLM lands. USFS lands make up 40 percent of all lands in the Upper Big Hole River TPA so activities there would likely have more influence on future fire characteristics than activities on BLM lands (17.7 percent of all lands in TPA).

Decisions to increase the level of wildland fire use, prescribed fire, or open burning by the public could impact the BLM's ability to use wildland fire and prescribed fire due to air quality concerns and requirements. This could postpone or eliminate BLM fuel reductions or treatments to improve FRCC.

Access is a critical component of wildland fire suppression. In some cases, access to public lands is being reduced by adjacent landowners gating or closing roads, which could hamper wildland fire suppression efforts and pose a risk to public and firefighter safety. Reducing access would also increase the potential for larger fires to occur due to an increase in time needed to access a fire and control it. Time needed to move in crews would be extended, and the ability to effectively apply and place resources (e.g., engines, water tenders, etc.) would be limited.

Effects on wildland fire management, including FRCC and firefighter and public safety due to management accomplished by other landowners may affect wildland fire management on public lands. When activity fuels (such as logging slash) are not treated adequately, fuel hazard could increase on adjacent lands which could affect fire intensity and severity on public lands. When adjacent owners treat fuels or implement fire mitigation plans in the WUI, fires are easier to suppress and firefighter safety is increased. In the Boulder/Jefferson City TPA, activities on private lands (32 percent of all lands in TPA) would have more influence on future fire characteristics in the area overall than activities on BLM lands (17.7 percent of all lands in TPA).

Human population increases and subsequent residential development are likely to expand the WUI and could alter forest management, taking the emphasis off restoring historic composition and structure and focusing more on fuel reduction.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Effects Common to All Alternatives

Alternative-specific risks or impacts to cultural and paleontological resources are difficult to discern due to a lack of extensive site-specific knowledge about the presence of these resources in a given TPA. By designating open routes, limiting open-country travel, and closing some routes, inadvertent discovery of cultural and paleontological resources and vandalism to them is reduced. Higher road densities in a given area would allow greater access to more land on the average, but that does not imply greater amounts of vandalism, since the vehicles would remain on designated routes.

VISUAL RESOURCES

Effects Common to All Alternatives

Roads (temporary or permanent) may affect visual quality. Roads that remain open for public use may impact visual qualities where noticeable. The quantity of open roads would also influence sensitivity levels since with more open roads, more areas would generally be viewed by more members of the public. Closing or decommissioning roads would generally reduce effects to visual resources and reduce sensitivity levels because fewer members of the public would generally be accessing and viewing areas with closed roads.

Effects of the Alternatives

Under Alternative A, approximately 158.6 road miles would remain open (including open with seasonal restrictions), while 7.4 miles would remain closed. This alternative would leave the greatest mileage of open roads and would have the greatest level of impact to visual resources of all alternatives.

Under Alternative B, there would be 80.9 miles of open road (including open with seasonal restrictions), 51.4 miles of closed road, and 28.5 miles of decommissioned road. Road closures and decommissioning under this alternative would reduce effects on visual resources compared to Alternative A.

Under Alternative C, there would be 60 miles of open road (including open with seasonal restrictions), 69.3 miles of closed road, and 33.5 miles of decommissioned road. Alternative C would have fewer adverse effects and would improve visual resources the most of all alternatives.

Under Alternative D, there would be 97.4 miles of open road (including open with seasonal restrictions), 33.2 miles of closed road, and 25.7 miles of decommissioned roads. Alternative D would improve visual resources compared to Alternative A, but would have more adverse effects than Alternatives B and C.

Cumulative Effects on Visual Resources

Under all alternatives, most activities on BLM lands would generally not adversely affect visual resources to unacceptable degrees because discretionary activities on BLM lands would be required to meet Visual Resource Management objectives within individual project areas.

Activities on non-BLM lands, particularly activities near BLM lands associated with residential development, urbanization, additional mining, or vegetation management, could have adverse cumulative effects on visual resources on BLM lands because BLM VRM objectives would obviously not apply to non-BLM activities.

LIVESTOCK GRAZING

Effects Common to All Alternatives

Roads and trails can potentially affect livestock grazing management. Roads and trails often act as avenues of noxious weed spread. Noxious and invasive weeds can reduce the quantity and quality of forage. Users of roads and trails can cause management problems for livestock permittees when they leave gates open at fences, vandalize range improvements, or harass livestock purposely or unintentionally.

Closure of roads and trails can improve or maintain the forage base by reducing vectors of noxious weed spread. Additionally, road and trail closures can reduce management conflicts. On the other hand, closures may increase permittees' time requirements if and when work has to be conducted with horses or afoot. Permittees could minimize effects of closed roads on grazing management time by seeking variances from the BLM for temporary use of specific closed roads.

Effects of the Alternatives

Under Alternative A, 158.6 miles of BLM roads and trails would remain open during the grazing season, and 7.4 miles of roads and trails would be closed. The effects would continue as described above. All action alternatives would close or decommission more roads and trails than Alternative A. As more roads and trails are closed, noxious and invasive weed spread along with multiple user conflicts would be reduced. On the other hand, permittee management time may increase. Consequently, more effects as described under the Effects Common to All Alternatives section would occur under Alternative C (60 miles open during grazing season, 102.8 miles closed or decommissioned) than under any other alternative. Alternative B (80.9 miles open during grazing season, 79.9 miles closed or decommissioned) would produce fewer effects than Alternative than C, but more than Alternative A or Alternative D (97.4 miles open during grazing season, 58.9 miles closed or decommissioned). Alternative D would have fewer effects than Alternatives B or C, but more than Alternative A.

Cumulative Effects on Livestock Grazing

A number of past, present, and reasonably foreseeable future actions affect livestock grazing at the scale of the entire Upper Big Hole River TPA. Livestock grazing will continue in the area and has the potential to impact forage quality and quantity. On public lands, ongoing rangeland health assessments and implementation of livestock grazing guidelines would continue to improve or maintain forage quality and quantity. On private lands, livestock grazing is expected to decline slowly as more ranch and farmland is subdivided.

Noxious weed control will continue on both public and private lands with varying degrees of success. To the extent that these efforts are successful, forage conditions would benefit.

The Big Hole Watershed group has completed a number of projects to improve livestock grazing, weed control, and irrigation practices on private land. Livestock grazing management would improve correspondingly.

The fuels reduction project scheduled for the Wise River area is not anticipated to have any major effects on livestock grazing. Reduction of conifers in meadows and parks would improve forage production for livestock. Some allotments may require growing season rest for one to two years after treatments are completed.

Because BLM lands make up only 17.7 percent of all lands in the Upper Big Hole River TPA, all of the BLM travel plan alternatives would have a minor contribution to cumulative effects on livestock grazing at the scale of the entire TPA.

MINERALS

Effects Common to All Alternatives

Road closures and decommissioning could affect access to locatable minerals in areas of moderate or high mineral potential. Operators would be required to seek travel variances from the BLM to use motor vehicles to conduct mineral exploration on closed roads, or to conduct exploration on seasonally restricted routes during the season of closure. Decommissioned roads could not be used for motorized exploration. Travel management provisions that require a permit or variance could result in reducing access to mining claims or interfere with the ability to conduct exploration work for some operators. Historic knowledge of mineralized areas associated with "closed" roads may be lost after long periods of time if no exploration occurs there. Additional costs and time could be required for exploration and development of mining projects associated with closed or decommissioned roads. Impacts of road closures or decommissioning in areas with low mineral potential would not be substantial to mineral development.

Effects of the Alternatives

Alternative A for the Upper Big Hole TPA would seasonally restrict access on 18 percent of the roads in areas with high mineral potential and 6 percent of those in moderate mineral potential areas (Table 4-94).

Alternative B for the Upper Big Hole TPA would seasonally restrict access on 14 percent, close 8 percent, and decommission 3 percent of the roads in areas with high mineral potential. Additionally this travel plan

alternative would seasonally restrict access on 4 percent and close 7 percent of roads in areas with moderate mineral potential in this TPA (Table 4-94).

Alternative C for the Upper Big Hole TPA would seasonally restrict access on 7 percent, close 16 percent, and decommission 3 percent of the roads in areas with high mineral potential. Additionally this alternative would seasonally restrict access on 4 percent, close 5 percent, and decommission 3 percent of roads in areas with moderate mineral potential in this TPA (Table 4-94).

Alternative D in the Upper Big Hole TPA would seasonally restrict access on 16 percent, close 6 percent, and decommission 2 percent of the roads in areas with high mineral potential. Additionally this alternative would seasonally restrict access on 5 percent, close 4 percent, and decommission 1 percent of roads in areas with moderate mineral potential in this TPA (Table 4-94).

Cumulative Effects on Access to Mineralized Areas

No other past, present, or reasonably foreseeable future actions in the Upper Big Hole River TPA would adversely affect mineral availability or access.

RECREATION

Effects of travel plan alternatives on Recreation in the Upper Big Hole River TPA are described qualitatively below.

Effects of the Alternatives

Under Alternative A, all BLM routes located within the TPA would continue to be managed as indicated on the Southwest Montana Interagency Visitor/Travel Map (interagency cooperative mapping effort, 1996 revision). Alternative A provides 158.6 miles of routes open to wheeled motorized use (70.6 miles open yearlong, 88.0 miles seasonally restricted). Where allowed, snowmobile use would continue to be open to area-wide cross-country use as well as use on existing routes, during the season of use, 12/2-5/15, conditions permitting.

Under Alternative B, motorized travel opportunities would be decreased by about 50 percent while non-motorized opportunities would be enhanced and conflicts between users would be reduced. Effects of Alternative C would be similar to Alternative B with the exception that 20 additional miles of roads would be closed and snowmobile use would be limited to designated routes only. This alternative would reduce motorized recreation opportunities while non-motorized opportunities would be most enhanced of all alternatives. Impacts of Alternative D would be similar to those of Alternative A with the exception that fewer secondary roads would be available to motorized travel.

Table 4-94 Analysis of Access to Mineral Potential Areas Upper Big Hole River TPA				
Mineral Potential	Open Miles (%)	Seasonally Restricted Miles (%)	Closed Miles (%)	Decom Miles (%)
Alternative A				
High	17.8 (11%)	29.8 (18%)	0.8 (0%)	0.0 (0%)
Moderate	10.2 (6%)	10.2 (6%)	0.1 (1%)	0.0 (0%)
Low	41.8 (25%)	48.0 (29%)	6.5 (4%)	0.0 (0%)
Total Miles = 165.3				
Alternative B				
High	7.7 (5%)	23.1 (14%)	13.4 (8%)	4.3 (3%)
Moderate	1.2 (1%)	6.7 (4%)	11.6 (7%)	1.0 (0%)
Low to none	12.2 (7%)	34.5 (21%)	26.4 (16%)	23.3 (14%)
Total Miles = 165.3				
Alternative C				
High	5.7 (3%)	11.3 (7%)	26.9 (16%)	4.6 (3%)
Moderate	1.2 (1%)	6.6 (4%)	7.6 (5%)	5.1 (3%)
Low to none	12.2 (7%)	25.5 (16%)	34.9 (21%)	23.8 (14%)
Total Miles = 165.3				
Alternative D				
High	8.9 (5%)	26.3 (16%)	9.3 (6%)	4.0 (2%)
Moderate	4.2 (3%)	7.9 (5%)	7.5 (4%)	0.9 (1%)
Low to none	12.2 (7%)	47.0 (28%)	16.4 (10%)	20.7 (13%)
Total Miles = 165.3				
Mineral Potential areas have been delineated by the Montana Bureau of Mines and Geology (MBMG)				

Cumulative Effects on Recreation

Under Alternative A, motorized travel opportunities would be the greatest under this alternative given the miles of roads available to wheeled vehicles and the acres available to snowmobiles. Big game hunting opportunities and motorized access within the Sawlog Gulch, Jerry Creek-Johnson Creek, Tie Creek, Dickie Hills, Sawmill, Humbug Spires/McClain Creek, and Soap/Camp Creek areas would continue. Existing travel restrictions in these areas would encourage big game retention, quality walk-in hunting and game retrieval challenges as motorized vehicle use would be somewhat limited. During the non-hunting season conflicts between non-motorized and motorized users would remain relatively high within some areas. Public access and management of developed recreation sites along the Big Hole River would continue to provide for a wide spectrum of water based opportunities and visitor trends are expected to increase. The Upper Big Hole Special Recreation Area and plan would continue and management priorities would remain high. The state would continue lead management responsibilities for the river and quality fishing and floating opportunities will continue subject to water flow conditions.

Under the action alternatives, big game hunting opportunities within the TPA would continue for both motorized and non-motorized users as the primary access routes would remain. Additional travel restrictions of secondary and primitive roads in numerous areas would promote more big game retention on public lands and better walk-in hunting experiences. Game retrieval challenges would be increased in many portions of the TPA since fewer retrieval roads would be available. Recreation Opportunity Spectrum designations would be established and therefore a range of varied settings would be provided and maintained. Although available travel routes and motorized riding opportunities would be limited, access to higher elevation lands and quality walk-in areas would be retained to help disperse users and ensure natural settings. Cumulative impacts on developed recreation sites and water based activities would be similar to Alternative A.

TRAVEL MANAGEMENT AND ACCESS

Effects of Alternative A

BLM routes in the Upper Big Hole River TPA would continue to be managed as both open yearlong (70.6 miles) and open with seasonal restrictions (88 miles) (Table-4-95). Alternative A would provide the greatest amount of motorized use opportunities and the least amount of non-motorized opportunities of all the alternatives.

Where allowed, snowmobile use would continue to be open to area-wide cross-country use as well as use on existing routes, during the season of use, 12/2-5/15,

Table-4-95 Upper Big Hole TPA Route Management Summary				
Proposed Management	Total Miles			
	Alt A	Alt B	Alt C	Alt D
Wheeled motorized routes				
Open Yearlong	69.9	21.1	19.2	26.8
Seasonally Restricted	88.0	59.8	40.8	70.6
Closed	7.4	51.4	69.3	33.2
Decommissioned	-	28.5	33.5	25.7
Non-motorized trails ¹	11.5	55.5	106.9	62.9

¹ Non-motorized trails include all open, open/restricted, and closed routes.

conditions permitting. Alternative A would provide the most miles of routes available to seasonal snowmobile users and the greatest opportunity for motorized winter use while providing the fewest opportunities for non-motorized winter recreation of all alternatives.

The extent of management activities and costs under Alternative A would be mixed. Less personnel time would be required to monitor travel compliance than under the action alternatives. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards) than under the action alternatives. Estimated costs for road/trail maintenance would be highest of all alternatives.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be minimal under this alternative, given the availability of motorized access.

Effects of Alternative B

Approximately 50 percent fewer route miles would be open to wheeled motorized access yearlong or seasonally restricted than under Alternative A (Table-4-95).

Snowmobile management would continue to remain substantially in effect as represented by the 1996 Southwest Interagency Visitor/Travel Map. However, several additional areas would be closed to cross country travel, and travel in other areas would be restricted to existing designated routes and trails. Proposed cross country closures include the area located between the Soap Gulch and Camp Creek roads, the Goat Mountain/Maiden Rock area, and the Sawmill Gulch/Nez Perce Ridge area. The proposed closures would have little impact on snowmobile use due to the poor snow conditions in these areas.

Route restrictions/closures that would enhance recreational opportunities include: enhancement of high-elevation hunting in the Humbug Spires area; road density reduction in the Nez Perce Creek road area that

would enhance non-motorized recreation, as well as provide big game security; and limiting motorized vehicle crossings of the Big Hole River in the Sawlog Gulch (Fishtrap Creek area) to game retrieval only, which could enhance non-motorized recreational experiences in that area.

For the Sawlog Gulch area, motorized access would be restricted to game retrieval only. This change would provide for improved public safety by minimizing the number of public vehicles fording the Big Hole River.

The extent of management activities and costs under Alternative B would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulletin boards) than under Alternative A. However, more effort would be required for public education and compliance than under Alternative A. Estimated costs for road/trail maintenance would be less than under Alternative A.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would increase under Alternative B compared to Alternative A.

Effects of Alternative C

Alternative C would have the least number of wheeled motorized routes open yearlong or seasonally restricted than all other alternatives in the Upper Big Hole River TPA (**Table-4-95**). This would result in fewer opportunities for motorized users. Alternative C would have 62 percent fewer motorized miles than Alternative A, and 26 percent fewer miles than Alternative B.

For areas open to snowmobile use under the Southwest Montana Interagency Visitor/Travel Map, travel would be restricted to designated routes only. No cross-country travel would be allowed. Alternative C would provide the lowest level of opportunities for snowmobile use.

Route closures that would enhance non-motorized opportunities include: additional yearlong closures between Soap Gulch and Camp Creek travel corridors (Humbug Spires area), additional yearlong closures near Johnson and Jerry Creeks (Jimmie New Creek area), and closure of the Sawlog Gulch route (Fishtrap Creek area).

Closing the Sawlog Gulch route (Fishtrap Creek area) would provide for improved public safety by eliminating fording of the Big Hole River.

Closure and decommissioning of routes in the Upper Big Hole River TPA would result in more non-motorized opportunities under Alternative C than under any other alternative. Alternative C would have 89 percent more miles of non-motorized trails than Alternative A, and 48 percent more than Alternative B.

The extent of management activities and costs under Alternative C would be mixed. Less personnel time would be required for initial implementation (signing

designated routes, installing bulletin boards) than under any alternative. However, more effort would be required for public education and compliance than under any other alternative. Estimated costs for road/trail maintenance would be the lowest of the alternatives.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be greater under Alternative C than under any other alternative.

Effects of Alternative D

Alternative D would offer the highest level of motorized access of the action alternatives with 97.4 miles of open and seasonally restricted routes (**Table-4-95**). This would be 38 percent less than Alternative A, but 17 and 38 percent more than under Alternatives B and C, respectively.

Conversely, Alternative D would provide fewer opportunities for non-motorized use than Alternatives B and C. Route closures under Alternative D that would enhance user opportunities include: additional routes in the Humbug Spires area and adjusting existing seasonal route restrictions to allow for high elevation big game hunting access; additional routes for the Jimmie New Creek area, including game retrieval routes; and a seasonal closure on Sawlog Gulch (Fishtrap Creek area) that could enhance non-motorized opportunities.

For the Sawlog Gulch/Fishtrap Creek area, motorized access would be managed as open/restricted with a seasonal closure from December 2 to July 15. This change would provide for improved public safety from fording the Big Hole River during periods of high river flows.

The Big Hole watershed would be a priority area for restoration and protection treatments. Vegetation treatments could impact user opportunities and create user conflicts, depending on the timing and duration of the treatments.

Snowmobile management and effects would be the same as under Alternative A.

The extent of management activities and costs under Alternative D would be mixed. Less personnel time would be required to monitor travel compliance than under Alternatives B and C, but more time would be needed than under Alternative A. However, more effort would be required for initial implementation (signing designated routes, installing bulletin boards) than under Alternatives B and C, but less effort would be needed than under Alternative A. Estimated costs for road/trail maintenance would be higher than the other action alternatives, but less than under Alternative A.

The need for the BLM and members of the public to obtain travel variances for temporary specific uses of specific closed roads would be greater under Alternative

D than under Alternative A, but less than under Alternatives B and C.

Cumulative Effects on Travel Management and Access

Under all alternatives there are a number of past, present, and reasonably foreseeable future BLM and non-BLM actions and activities affecting travel management and access in the Upper Big Hole River TPA.

The majority of the Upper Big Hole River TPA is characterized by undeveloped land (cattle ranches; BLM, State, and USFS lands). Only about 2,000 people live in the area, many of them making their living by ranching and hay farming. Human population growth for the TPA is expected to remain low. However, as the area becomes more populated, there could be increased public pressure to alter the travel management to accommodate more or less motorized use.

The TPA is largely undeveloped. Several small communities (Divide, Dewey, and Wise River) are located within the TPA; Melrose and Wisdom lie just outside. The extent of urbanization is low, only about 2,000 people live in the area. Urbanization is unlikely to become an issue for many years in this area.

Recreation use is well established in the TPA, with fishing and big game hunting topping the list. The Big Hole River has a national reputation as a premiere fly fishing destination. Big game hunting attracts regional and national attention as well. As recreation use grows, conflicts between non-motorized and motorized recreation users could lead to increased public demands for either more, or less motorized use.

The TPA includes important habitat for big game (elk, bighorn sheep, mule deer) and fisheries (last wild population of fluvial Arctic grayling). Concerns could lead to demands to restrict motorized use.

The Humbug Spires WSA, Humbug Spires Potential ACEC, and Upper Big Hole River Eligible WSR segment are located within the TPA. These special designations could influence (restrict) travel management for existing roads and trails as well as for new proposed roads and trails.

In some site specific cases, visual resource management may effect or restrict new road construction.

Applications for right-of-way permits to access private property or for commercial development are likely to increase in the future. As a result, public access to BLM lands, via the rights-of-way, could increase as well.

Limits or reductions in the BLM's funding and ability to maintain designated routes could lead to an overall reduction of maintained motorized routes.

A variety of resource management projects, such as BLM initiated vegetation treatments, or wildland fire

fuels reduction projects, could affect travel management. BLM forest management activities from 1984 to present include 126 acres of forest planting and 246 acres of timber harvest. Future activities may include approximately 430 acres of forest and woodland treatment (thinning, selective harvest). Past wildland fire management activities include treatments of 474 acres of prescribed fire and 141 acres of mechanical treatments in the Jerry Creek and Dickie Hills areas. Future treatments would include the Highland Mountain and the Wise River projects. The Highland Mountain project will entail 2,087 acres of mechanical treatment and 2,659 acres of prescribed fire treatment starting in 2007 through 2012. The Wise River project (currently being planned) will consist of mechanical and/or prescribed fire treatments ranging from 500-2,000 acres, focused on the urban interface areas. Depending on the type and scope of project, effects could vary from temporary, short-term area/route closures, to new opportunities (new routes) for motorized or non-motorized access.

A portion of this TPA is highly mineralized, particularly in the Soap Gulch/Camp Creek area. Current mining activity is low. Increases in mineral prices, however, could lead to additional increased or renewed mining activity. Depending on the type and scope of mining activity, effects on travel planning could vary from temporary, short-term area/route closures, to increased opportunities (new routes) for motorized or non-motorized access.

Noxious weeds and non-native invasive species are well established and spreading rapidly in the TPA. Motorized activities play a large role in the distribution of noxious weeds. Concerns over the spread of noxious weeds may lead to the need to impose motorized travel restrictions or closures.

Motorized use on dirt roads and trails is a major contributor to soil erosion and stream sedimentation. These concerns may influence travel management, and result in fewer motorized opportunities.

Most illegal activities (trash dumping, drug use, underage alcohol use, unattended camp fires, vandalism, etc.) are directly associated with motorized use. Increases in illegal activity may lead to a need to alter travel management and impose motorized travel or other restrictions (site specific management).

For perspective, BLM managed lands represent approximately 17.7 percent of the total travel planning area (357,275 total acres, 63,108 BLM acres); while BLM managed routes represent approximately 12.6 percent of the total routes available (1,309 total miles, 165 miles of BLM roads/trails). Future travel management (for all agencies, nationwide) is likely to lead to fewer opportunities for motorized recreational use than under current management (particularly for OHV use). As a result, BLM routes available to motorized use in this TPA could experience increased

use from displaced users, eventually leading to more concentrated use, increased resource impacts, and user conflicts. These impacts could lead to demands from motorized users for additional routes, and conversely, demands from non-motorized users for fewer routes.

Under all alternatives, increases in human population, recreation use, user conflicts; and concerns for wildlife, fisheries resources, noxious weed spread, soil erosion/water quality, and illegal activities are likely to lead to increased conflicts associated with travel management. Under Alternative A, this may lead to increased demands to restrict motorized travel, particularly in the areas adjacent to Divide, Dewey, and Wise River. Under Alternative B, these pressures would have less impact on travel management than under Alternatives A and D, due to the overall reduction in motorized opportunities and separation of motorized and non-motorized uses. Under Alternative C, these pressures would likely have the least impact on travel management than under the other alternatives, due to the greatest reduction in motorized opportunities and separation of motorized and non-motorized uses of all alternatives. Under Alternative D, these pressures may lead to increased demands to restrict motorized travel, particularly in areas with urban development.

TRANSPORTATION FACILITIES

For the sake of this discussion, "open" roads include roads that are open yearlong as well as those that are open with seasonal restrictions.

Effects of Alternative A

Under Alternative A, the Upper Big Hole TPA would have 157.9 miles of open roads and no motorized trails (**Table-4-96**). Estimated costs for annual maintenance and stabilization of roads under Alternative A would be substantially higher than under any other alternative.

Table-4-96				
Upper Big Hole Route/Trail/Maintenance Costs				
Classification/ Cost	Alt A	Alt B	Alt C	Alt D
Miles of Open/ Restricted Roads	158.6	80.9	60	97.4
Motorized Trails	0	0	0	0
Annual Road Maintenance	\$12,632	\$6,472	\$4,800	\$7,792
Annual Trail Maintenance	\$0	\$0	\$0	\$0
Periodic Road Stabilization	\$5,053	\$2,589	\$1,920	\$3,117
Periodic Trail Stabilization	\$0	\$0	\$0	\$0
Monitoring/ Compliance	\$7,895	\$4,045	\$3,000	\$4,870
Weed Control	\$2,369	\$1,214	\$900	\$1,461

Estimated annual costs for monitoring and compliance, and weed control would also be more than under the action alternatives.

Effects of Alternative B

Under Alternative B, the Upper Big Hole TPA would have 80.9 miles of open roads and no motorized trails (**Table-4-96**). Estimated costs for annual maintenance and stabilization of roads under Alternative B would be more than two times less than under Alternative A, more than under Alternative C, and slightly less than under Alternative D due to the reduction in roads from current conditions. Estimated annual costs for monitoring, compliance, and weed control would also be much less than under Alternative A.

Effects to transportation facility management under Alternative B would result in increased costs associated with new signage and sign maintenance due to changing seasonal use restrictions in the Humbug Spires area, the

reduction in road density in the Jimmie New Creek area, and restricting motorized access in the Sawlog Gulch area of Fishtrap Creek.

Closing additional portions of the Upper Big Hole TPA to cross-country snowmobile travel would also result in an increase in transportation facility costs for additional signage and sign maintenance.

Effects of Alternative C

Under Alternative C, the Upper Big Hole TPA would have 60 miles of open roads and no motorized trails (**Table-4-96**). Estimated costs for annual maintenance and stabilization of roads under Alternative C would be the least of all the alternatives due to the least number of motorized routes. Estimated annual costs for monitoring, compliance, and weed control would also be less than under the other alternatives.

Effects to transportation facility management under Alternative C would result in increased costs associated with new signage and sign maintenance due to route closures and seasonal restriction changes in the Humbug Spires area, route closures to reduce road density in the Jimmie New Creek area, and the year-long closure of the Sawlog Gulch area of Fishtrap Creek.

Changing portions of the TPA from an open designation to a limited designation for snowmobile use would result in increases costs associated with new signage and sign maintenance.

Effects of Alternative D

Under Alternative D, the Upper Big Hole TPA would have 97.4 miles of open roads and no motorized trails (**Table-4-96**). Estimated costs for annual maintenance and periodic stabilization of roads under Alternative D would be about half the cost as under Alternative A due to a reduction in motorized access. Road maintenance

would be higher under Alternative D than under either Alternative B or C. Estimated annual costs for monitoring, compliance and weed control would also be much less under Alternative D than under Alternative A, and more than under Alternatives B and C.

Transportation facility costs under Alternative D would increase due to new signage and sign maintenance required in the Humbug Spires area, Jimmie New Creek area, and the Sawlog Gulch area of Fishtrap Creek.

LANDS AND REALTY

Effects Common to All Alternatives

The Butte Field Office administers approximately 122 rights-of-way within the boundaries of the Upper Big Hole TPA, which encumber approximately 6,805 acres of BLM land (Table 4-97). Various types of road rights-of-way (ROW) are the most common type of grant, accounting for 57 percent, or over half of the total. Other types of authorized uses include: oil and gas pipelines, lines for electrical distribution and telephone facilities, communication sites, ditches, railroads, and mineral material sites.

Table 4-97 Upper Big Hole TPA ROWs/Leases		
Type	Approximate Number	Approximate Acres
Roads	70	2,907
Power	20	865
Telephone	4	45
O&G Pipelines	1	2
Comm Sites	0	0
2920 Leases	0	0
Other	27	2,986
Totals	122	6,805

Approximately one right-of-way application for new facilities as well as amendments, assignments, renewals, or relinquishments of existing right-of-way grants are processed annually in the TPA. This would not vary by alternative.

The general trend of granting rights-of-way is expected to increase through the planning period as a result of increasing public demands. From a cumulative effects standpoint, development of adjacent federal, state and private land, increased recreational use and the trend of homeownership away from urban areas, coupled with traditional on-going uses, are all expected to require more guaranteed access involving public land, including BLM lands.

SPECIAL DESIGNATIONS

There would be no effects to any special designation areas such as Wild and Scenic Rivers, Wilderness Study Areas, or Areas of Critical Environmental Concern under any of the travel plan alternatives for the Upper Big Hole River TPA.

CUMULATIVE EFFECTS OF TRAVEL PLANS AT THE PLANNING AREA SCALE

This section discusses cumulative effects of the five site-specific travel plans in aggregate at the level of all BLM lands in the Butte Field Office (Decision Area), as well as (to the extent possible) all lands in the entire Planning Area regardless of ownership. Effects of activities on BLM lands must be considered in the context of the fact that the approximately 302,000 acres of BLM lands administered by the Butte Field Office make up about 4.2 percent of the approximate total of 7,191,181 acres of land in the Planning Area. For the sake of context, total road miles in the Planning Area have been calculated based on available GIS data as approximately 17,810 miles. This figure is an underestimation of total road miles and should be considered a minimum. Total road mileage on Butte Field Office lands is estimated at 856 miles, or 4.8 percent of all roads in the Planning Area based on the 17,810 mile figure. Private lands make up about 49 percent of all lands and 64 percent of all roads are on private lands in the Planning Area. References to effects in this section tie back to effects described for a particular resource or resource use under the TPA-specific discussions.

No additional cumulative effects to Minerals, Lands and Realty, Cultural and Paleontological Resources, or Special Designations associated with the five site-specific travel plans have been identified at the Decision Area or Planning Area scales beyond those discussed in the cumulative effects section for the RMP.

SOILS

Under current conditions (Alternative A), approximately 172 miles of motorized routes mapped on the BLM transportation system would remain closed. Generalized impacts to soil resources described above for each TPA (and in "Effects Common to All Alternatives" sections) would reduce over time on these routes as they revegetate and soils stabilize. These routes represent about 20 percent of the approximately 856 BLM road miles, and 1.0 percent of the at least 17,810 road miles across all ownerships in the entire Planning Area.

Alternative B would close (318 miles) or decommission (53 miles) approximately 371 miles of routes in the Decision Area currently open to use by motorized vehicles, the second most of any alternative. These routes represent about 43 percent of the approximately

856 BLM road miles in the Decision Area, and 2.1 percent of the at least 17,810 road miles across all ownerships in the entire Planning Area. This reduction in ground disturbance should reduce adverse effects on soils more than under Alternatives A and D, but less than under Alternative C.

Alternative C would close (375 miles) or decommission (50 miles) approximately 425 miles of routes currently open to use by motorized vehicles. These routes represent about 50 percent of the approximately 856 BLM road miles in the Decision Area, and 2.4 percent of the at least 17,810 road miles across all ownerships in the entire Planning Area. This reduction in ground disturbance associated with motorized routes would reduce impacts to soils more than under other alternative.

Alternative D would close (266 miles) or decommission (44 miles) approximately 310 miles of routes currently used by motorized vehicles. These routes represent about 36 percent of the approximately 856 BLM road miles in the Decision Area, and 1.7 percent of the at least 17,810 road miles across all ownerships in the entire Planning Area. This reduction in ground disturbance would benefit soils more than in Alternative A, but less than in Alternatives B and C.

WATER RESOURCES

Under current conditions (Alternative A) approximately 172 miles of motorized routes, mapped on the BLM transportation system for the entire Decision Area, would remain closed. Over time, erosion and sediment delivery would likely be reduced as these closed routes revegetate and soils stabilize.

Alternative B would close (318 miles) or decommission (53 miles) approximately 371 miles of routes in the Decision Area currently open to use by motorized vehicles, the second most of any alternative. This reduction in ground disturbance would reduce soil erosion, promote vegetative recovery, and should produce a moderate to high long-term benefit to water quality (compared to the current conditions).

Alternative C would close (375 miles) or decommission (50 miles) approximately 425 miles of routes in the Decision Area currently open to use by motorized vehicles. This reduction in ground disturbance associated with motorized routes would reduce impacts to water quality (primarily sedimentation) more than with any other alternative.

Alternative D would close (266 miles) or decommission (44 miles) approximately 310 miles of routes in the Decision Area currently used by motorized vehicles. This reduction in ground disturbance would reduce soil erosion and should provide a moderate to high long-term benefit to water quality (compared to current conditions). However, the improvement would be less than under Alternatives B and C.

Generally, road density is an indicator of overall watershed health and function. Watersheds with higher road densities tend to have lower water quality due to greater potential for erosion and subsequent sedimentation. Of all the alternatives, Alternative A maintains the most BLM acres in the entire Decision Area with high road density (107,566 acres with greater than 2 mi/mi² road density) and the fewest acres with low road density (116,236 acres with less than 1 mi/mi² road density (Table 4-98).

Alternative B would result in more acres with low road density across the Decision Area (131,982 acres with less than 1 mi/mi² road density) compared to Alternative

Table 4-98 Acres of BLM Land in Road Density Categories by Alternative for all Decision Area Lands			
Alternative	Road Density Category		
	Low (<1 mi/mi ²)	Moderate (1 to 2 mi/mi ²)	High (>2 mi/mi ²)
Alt. A	116,236	78,175	107,566
Alt. B	131,982	82,267	87,729
Alt. C	141,264	79,516	81,196
Alt. D	123,073	83,424	95,481

A (116,236 acres) and Alternative D (123,073 acres), but less than Alternative C (141,264 acres). In the moderate road density category (1 to 2 mi/mi² road density), Alternative B would produce over 4,000 more acres of this category compared to Alternative A. Alternative B would result in almost 20,000 acres less in the high road density category (greater than 2 mi/mi² road density) than Alternative A. This would represent a reduction in risks and adverse effects to water resources associated with watershed conditions, from the current management situation.

Across all Decision Area lands, Alternative C would provide the most acres with low road density (141,264 acres with less than 1 mi/mi² road density) compared to all other alternatives (Table 4-98). This represents 25,000 more acres than currently exists. Alternative C would also produce the fewest acres with high road densities (road density greater than 2 mi/mi²) of all alternatives (26,000 fewer acres than current conditions). Of the action alternatives, Alternative C would produce 6,500 fewer acres of high road density compared to Alternative B and 14,300 less than Alternative D. This would indicate a lower risk to water quality under Alternative C than under the other alternatives.

Alternative D would result in more areas with low road densities than currently exists (123,073 acres versus 116,236 acres with Alternative A). However, it would have the least among the action alternatives. It would also provide a reduction in the amount of area with high road density (greater than 2 mi/mi² road density) from current conditions (95,481 acres versus 107,560 acres for Alternative A). However, this would be the lowest reduction among the action alternatives. These road

densities suggest that this alternative would pose a reduced risk (to water quality) from current conditions, but the highest among the action alternatives.

Motorized routes within 300 feet of streams generally have greater potential to impact water quality through erosion and sedimentation, increased water temperatures (due to loss of shading vegetation), and direct alteration of stream channel morphology than those farther away. Under Alternative A, approximately 87.7 miles of motorized routes within 300 feet of streams (including intermittent streams) would remain open to motorized use Decision Area-wide. This is the highest of any alternative and represents the greatest threat to water quality associated with motorized routes of the alternatives.

Under Alternative B, approximately 70.8 miles of motorized routes within 300 feet of streams (including intermittent streams) would remain open to motorized use Decision Area-wide. This is less than with Alternatives A and D (87.7 miles and 74.6 miles, respectively), but more than with Alternative C (67.1 miles). Alternative B would pose the second lowest threat to water quality (associated with roads in and near riparian areas) of all alternatives. It would also represent an improvement over existing conditions.

Under Alternative C, approximately 67.1 miles of motorized routes within 300 feet of streams (including intermittent streams) would remain open to motorized use Decision Area-wide. This is less than with any other alternative and would represent a reduction of 21.6 miles from current conditions. Therefore, Alternative C would pose the lowest threat to water quality associated with roads in and near riparian areas of all alternatives.

Under Alternative D, approximately 74.6 miles of motorized routes within 300 feet of streams (including intermittent streams) would remain open to motorized use Decision Area-wide. This is 13.1 miles less than are currently open but would leave more miles open than under Alternatives B and C. As a result, Alternative D would pose the second greatest threat to water quality related to roads in and near riparian areas of all alternatives (but it would still represent an improvement over current conditions).

Overall, from a roads management standpoint, Alternative C would pose the greatest improvement to water resources (and least contribution to adverse cumulative effects) of all the alternatives. Alternative B would be the next most beneficial, followed by Alternative D, then Alternative A. At the Planning Area scale, effects to water resources associated with management of the 856 miles of road administered by the Butte Field Office would be minor in the cumulative effects context of the at least 17,810 road miles in the Planning Area overall.

VEGETATIVE COMMUNITIES – FOREST RESOURCES AND FOREST AND WOODLAND PRODUCTS

Since BLM manages only 4.8 percent of the road miles in the Planning Area on the whole, the extent of cumulative effects from road management on BLM lands at the Planning Area scale is not great. However, federal and state public lands are used more extensively than other lands for firewood and other product gathering by the general public, as permission or a bill of sale is needed from landowners to gather products from private lands.

Effects referenced below tie back to effects of travel plan alternatives on forest resources and forest products described for each TPA-specific discussion above.

Effects of Alternative A

As compared with the other alternatives, travel management under Alternative A provides the highest level of support for forest/woodland management and timber removal activities. There would be no impact on the forest and woodland treatments or the forest products program from travel management. Alternative A has the most miles of open road for economic efficiency, as well as to provide public access for small sales permits (firewood and Christmas trees in particular).

At the scale of all BLM lands managed by the Butte Field Office, Alternative A would retain closure on approximately 20 percent (172 miles) of the current total of approximately 856 road miles. No additional roads would be decommissioned with this alternative so all 172 miles of closed roads would be subject to potential use for vegetation treatments if travel variances for temporary road use were allowed.

Effects of Alternative B

Travel management under Alternative B in the five TPAs being analyzed with this RMP revision, would provide an adequate level of support for the proposed forest management activities by maintaining approximately 84 percent of the existing roads in these TPAs shown under Alternative A as available for forest management and timber removal activities. While Alternative B would reduce the amount of open and limited use roads for the public by about 55 percent of the total roads available under Alternative A, travel variances could allow temporary use of “closed” roads for vegetation management projects. Road closures under Alternative B are expected to reduce the economic efficiency of some projects, as well as reduce by approximately one-half, public access for small sales permits (firewood and Christmas tree) in these five TPAs. The maintenance costs for the closed roads would also be reduced, improving management efficiency in isolated areas which have limited product availability and low priority for vegetative treatment.

At the scale of all BLM lands managed by the Butte Field Office, Alternative B would close or decommission approximately 44 percent (371 miles) of the current total of approximately 856 road miles. Approximately 53.4 miles (6.2 percent of Field Office total) of the road miles across the Field Office would be decommissioned under this alternative. The remaining 318 miles of closed roads would be subject to potential use for vegetation treatments if travel variances for temporary road use were allowed. Alternative B would contribute to cumulative effects associated with making planning and implementation of vegetation treatment projects more costly and complex, as well as decreasing public access for forest product use more than Alternatives A and D, but less than Alternative C.

Effects of Alternative C

Effects from proposed travel management under Alternative C in the five Travel Planning Areas (TPAs) being analyzed with this RMP revision, would be reduced when compared to Alternative B in spite of the fact that no construction of new permanent roads would be allowed for purposes of extracting forest products under Alternative C. Alternative C would maintain approximately 87 percent of the existing roads in the five TPAs under Alternative A, as available for forest management and timber removal activities. While Alternative C would reduce the amount of open and limited use roads for the public by about 67 percent of the roads available under Alternative A, travel variances could allow temporary use of "closed" roads for vegetation management projects. Road closures under Alternative C are expected to reduce the economic efficiency of some projects, as well as reduce by approximately two thirds, public access for small sales permits (firewood and Christmas tree) in these five TPAs.

At the scale of all BLM lands managed by the Butte Field Office, Alternative C would close or decommission approximately 49 percent (425 miles) of the current total of approximately 856 BLM road miles. Approximately 50.1 miles (5.8 percent of Field Office total) of the road miles across the Field Office would be decommissioned under this alternative. The remaining 375 miles of closed roads would be subject to potential use for vegetation treatments if travel variances for temporary road use were allowed. Alternative C would contribute the most of all alternatives to cumulative effects associated with making planning and implementation of vegetation treatment projects more costly and complex, as well as decreasing public access for forest product use.

Effects of Alternative D

Effects from proposed travel management under Alternative D in the five Travel Planning Areas (TPAs) being analyzed with this RMP revision, would be similar to those described for Alternative C. Alternative D

would maintain approximately 87 percent of the existing roads in the five TPAs under Alternative A, as available for forest management and timber removal activities. While Alternative D would reduce the amount of open and limited use roads for the public by about 39 percent of the roads available under Alternative A, travel variances could allow temporary use of "closed" roads for vegetation management projects. Road closures under Alternative C are expected to reduce the economic efficiency of some projects, as well as reduce by approximately 39 percent, public access for small sales permits (firewood and Christmas tree) and reduced ability to meet public demand in these five TPAs.

At the scale of all BLM lands managed by the Butte Field Office, Alternative D would close or decommission approximately 36 percent (310 miles) of the current total of approximately 856 road miles. Approximately 43.4 miles (5.1 percent of Field Office total) of the road miles across the Field Office would be decommissioned under this alternative. The remaining 267 miles of closed roads would be subject to potential use for vegetation treatments if travel variances for temporary road use were allowed. Alternative D would contribute to cumulative effects associated with making planning and implementation of vegetation treatment projects more costly and complex, as well as decreasing public access for forest product use, less than Alternatives B and C, but more than Alternative A.

VEGETATIVE COMMUNITIES -NOXIOUS WEEDS

Effects of the five site-specific travel plans in aggregate at the Field Office scale are discussed below. In this discussion closed or decommissioned roads are considered to reduce impacts to the landscape associated with noxious weeds because they eliminate motorized vehicle use as a vector for increasing spread of noxious weeds.

Since BLM roads make up about 4.8 percent of all roads and BLM lands make up 4.2 percent of all lands in the Planning Area, effects of BLM travel planning alternatives on noxious weeds at the RMP Planning Area scale would be minor. Activities and effects discussed above for each TPA on private lands (49 percent of lands, 63 percent of roads) and other public lands (42 percent of lands, 29 percent of roads) would have a stronger influence on noxious weeds in the Planning Area with activities on private lands likely having the greatest effect overall.

Effects of Alternative A

At the scale of all BLM lands managed by the Butte Field Office, Alternative A would retain closure on approximately 20 percent (172 miles) of the current total of approximately 856 BLM road miles. No additional roads would be decommissioned with this alternative. Alternative A would have the least positive contribution

of all alternatives to cumulative effects on weeds by providing for the largest network of open BLM roads for weed spread. Weed spread would be greatest under this alternative than under all other alternatives.

Effects of Alternative B

At the scale of all BLM lands managed by the Butte Field Office, Alternative B would close or decommission approximately 44 percent (371 miles) of the current total of approximately 856 BLM road miles. Alternative B would contribute positively to cumulative effects on noxious weeds by reducing open road miles from on which weed spread can occur. Under Alternative B these benefits would be greater than under Alternatives A and D, but less than under Alternative C. Alternative B would have higher weed treatment costs on a per road mile basis than Alternative A due to increased concentration of motorized use on fewer open road miles.

Effects of Alternative C

At the scale of all BLM lands managed by the Butte Field Office, Alternative C would close or decommission approximately 49 percent (425 miles) of the current total of approximately 856 BLM road miles. Alternative C would contribute positively the most of all alternatives to cumulative effects on noxious weeds by promoting weed spread from fewer open roads than under any other alternative. Like Alternative B, Alternative C would have higher weed treatment costs on a per road mile basis than Alternative A due to increased concentration of motorized use on fewer open road miles.

Effects of Alternative D

At the scale of all BLM lands managed by the Butte Field Office, Alternative D would close or decommission approximately 36 percent (310 miles) of the current total of approximately 856 BLM road miles. Alternative D would contribute positively to cumulative effects on noxious weeds by promoting less weed spread from roads less than Alternatives B and C, but more than Alternative A. Like Alternatives B and C, Alternative D would have higher weed treatment costs on a per road mile basis than Alternative A due to increased concentration of motorized use on fewer open road miles.

VEGETATIVE COMMUNITIES – RIPARIAN VEGETATION

The following discussion summarizes contributions to cumulative effects on riparian vegetation associated with BLM road management at the scale of all BLM lands in the Butte Field Office. Specific mechanisms of effect on riparian vegetation tie back to effects described for TPA-specific discussions above, particularly in the Effects Common to All Alternatives sections of those

discussions. Since BLM roads make up about 4.8 percent of all roads and BLM lands make up 4.2 percent of all lands in the Planning Area, effects of BLM travel planning alternatives on riparian vegetation at the RMP Planning Area scale would be minor. Activities and effects discussed above for each TPA on private lands (48 percent of lands, 63 percent of roads in Planning Area) and other public lands (42 percent of lands, 29 percent of roads in Planning Area) would have a stronger influence on riparian vegetation in the Planning Area with activities on private lands likely having the greatest effect overall.

Effects of Alternative A

Under Alternative A, Decision Area-wide, approximately 87.7 miles of routes within 300 feet of streams and wet areas would remain open to motorized use. While this is not a direct indication of road and trail effects on riparian vegetation, it is a relative indication when compared to the other alternatives. Alternative A would leave the greatest mileage of routes within 300 feet of streams open to motorized use of all alternatives.

Effects of Alternative B

Under Alternative B, Decision Area-wide, approximately 70.8 miles of routes within 300 feet of streams and wet areas would remain open to motorized use. This would be less than under Alternative A (87.7 miles) and Alternative D (74.6 miles), but more than under Alternative C (67.1 miles), and suggests that Alternative B has the next to least amount of road-related impacts to riparian vegetation of the alternatives.

Effects of Alternative C

Under Alternative C, Decision Area-wide, approximately 67.1 miles of routes within 300 feet of streams and wet areas would remain open to motorized use. This is the least of all alternatives and suggests that Alternative C would have the least road-related impacts (and most benefits) to riparian vegetation of all alternatives.

Effects of Alternative D

Under Alternative D, approximately 74.6 miles of motorized routes within 300 feet of streams would remain open to motorized use Decision Area-wide. This is less than under Alternative A but more than under Alternatives B and C. This suggests that Alternative D would pose the next greatest amount of impact associated with roads to riparian vegetation of all alternatives.

WILDLIFE

Effects of Alternative A

Under Alternative A, there would be approximately 472 miles of open roads in the Decision Area and an

additional 157.4 miles with seasonal closures. This is substantially more miles of open roads compared to the action alternatives. Limited road restrictions and road closures under Alternative A would not address the impacts of travel management within important wildlife habitat areas such as big game winter and calving habitat, occupied grizzly bear habitat, and wildlife movement corridors. Roads can result in loss of habitat and approximately 2-5 acres of habitat is permanently lost with every mile of road. Open roads cause disturbance and displacement of wildlife, especially to those species sensitive to disturbance, or during crucial seasons of use (winter or spring). Roads fragment habitat, introduce noxious weeds and make wildlife susceptible to direct mortality (road kill and hunting).

Riparian Habitat

Roads within riparian areas can cause disturbance to wildlife and degradation of habitat. There could be a loss of habitat for resident and migratory birds that use riparian areas for nesting and brood rearing. In addition, habitat would be lost for a wide range of wildlife species that use riparian areas for breeding, denning, foraging, overwintering, or for travel corridors. The more roads within riparian areas, especially open roads, the lower the quality of habitat (through disturbance and loss of vegetation) and less likely the habitat would be used.

Riparian roads were evaluated within a 300-foot area adjacent to streams to compare the effects of roads in riparian areas between alternatives. Across Butte Field Office lands, there would be 87.7 miles of open roads and 17 miles of closed roads within riparian areas under Alternative A. This would be considerably more open roads and fewer closed roads than under the action alternatives.

Elk Winter Range

Roads can impact big game species, especially during critical phases of their life cycle. Disturbance and displacement of big game species can increase stress and energy demands of animals during critical periods such as the winter, breeding or calving seasons, and reduce survival, especially during the winter and spring months. Motorized use of roads can produce disturbance that prevents full utilization of available habitat. The losses in potential use of habitat can exceed 50 percent when open road densities exceed 2 mi/mi² (Christensen et al. 1993). During the hunting season, the probability of bull elk survival in areas close to open roads is much lower than in areas away from roads. Road kill causes direct mortality of elk and major interstate freeways may act as movement barriers in some cases.

Table 4-99 displays road densities in big game winter range by big game analysis areas (distinct geographic locations based on winter range and Elk Management Units) in the entire Decision Area (all Butte Field Office lands).

Alternative A would have the highest road density in comparison to the action alternatives. Of the 11 Big Game Analysis Units, five of them would have more acres with high road density than moderate or low road densities (Big Belts, Blackfoot, Clancy, Granite Butte and Jefferson) (**Table 4-99**). Three Big Game Analysis Units (Clancy, Granite Butte and Jefferson) offer large acres of potential winter range within the Decision Area but the quality of this habitat is low due to high open road densities under Alternative A. Winter range would be greatly improved in these three Big Game Analysis Units with the reduction of road densities under Alternatives B and C and moderately to greatly improved with a reduction of road densities under Alternative D.

Table 4-99
Decision Area Road Densities within Elk Winter Range by Big Game Analysis Area Under Alternative A

Elk Winter Range Analysis Unit	Acres of Low Density (0-1 mi/mi ²)	Acres of Moderate Density (1-2 mi/mi ²)	Acres of High Density (>2 mi/mi ²)
Big Belts	2,193	2,207	2,288
Big Hole	12,958	4,504	5,554
Blackfoot	49	76	320
Clancy	1,547	2,159	7,148
Elkhorns	16,225	8,515	4,631
Granite Butte	1,932	3,886	11,881
Highlands	14,871	6,205	5,333
Jefferson	13,059	7,003	13,317
Missouri	19,955	1,409	2,667
Upper Missouri	4,115	1,437	929
Yellowstone	2,370	660	222

Low Density - (0-1 mi/mi²), Moderate Density - (1-2 mi/mi²), High Density - (>2 mi/mi²)

Source: GIS Analysis

The amount of big game security habitat across all Butte Field Office BLM lands Decision Area-wide under Alternative A would be 5,846 acres. This is the least amount of security habitat of all alternatives (**Table 4-100**).

Table 4-100
Decision Area Acres of Big Game Security Habitat Field Office-wide by Alternative

	A	B	C	D
All BLM Lands in Butte Field Office	5,846	8,510	10,946	7,007

Core and Subcore Habitat

Core areas were described as areas large enough for wildlife to forage and reproduce, while subcore areas

were areas that could act as stepping stones for wildlife as they moved through the region. **Table 4-101** shows the approximate acres by road density categories displayed as “low”, “moderate” and “high” for core and subcore habitat. These acres were based on a Moving Windows Analysis.

Table 4-101 Core and Subcore Areas – Approximate Acres by Road Density Category			
	Low Road Density (0-1)	Moderate Road Density (1-2)	High Road Density (>2)
Planning Area			
Alt. A	2,001,951	515,059	878,065
Alt. B	2,010,928	520,019	864,139
Alt. C	2,012,918	520,146	862,134
Alt. D	2,007,448	522,053	865,577
Decision Area			
Alt. A	33,406	12,629	25,564
Alt. B	40,458	15,052	16,099
Alt. C	42,043	14,959	14,638
Alt. D	37,442	16,850	17,334

Because core and subcore areas were delineated based on existing areas with low road density, these areas have the most acres with low road density in both the Planning and Decision Areas.

At the Planning Area scale, BLM roads can affect the quality of core and subcore habitat on other federal and private lands. BLM roads adjacent to other lands with low road densities can degrade the quality of the adjacent habitat and reduce the use of those areas by wildlife. Alternative A would have substantially fewer acres with low road densities than the action alternatives in core and subcore habitat.

Approximately 24 percent (71,600 acres) of the Decision Area is considered core or subcore habitat. As with the Planning Area, Alternative A would have the fewest BLM acres with low road density and Alternative C would have the most acres. The amount of BLM acres in low road density would be substantially less under Alternative A than the action alternatives. Alternative A would provide roughly 7,000 fewer BLM acres of low road density than Alternative B and approximately 4,000 fewer acres than Alternative D (**Table 4-101**). Alternative A would have roughly 8,600 fewer BLM acres of core and subcore habitat in low road density than Alternative C.

Wildlife Movement Corridors

Wildlife travel corridors are a vital component of habitat for a variety of species. Corridors are travel routes used by wildlife to allow animals to disperse to new core areas and/or allow for seasonal movements between summer and winter ranges. A corridor may also be used for daily movements from loafing to foraging areas. Habitat fragmentation and isolation of populations as a result of degradation or elimination of corridors can result in small, vulnerable wildlife populations. Disturbance related to high road density within wildlife corridors can degrade the quality of wildlife corridors, eventually making them unavailable to wildlife species that depend on them. Corridors were described as areas of predicted movement between core and subcore areas, where habitat quality is high, but not as high and contiguous as the core and sub-core areas.

Craighead *et al.* (2002) modeled wildlife corridors within the Northern Rocky Mountain Region, delineated core and subcore areas, and described corridors based on their habitat quality. High road densities within wildlife movement corridors can degrade the quality of corridors, eventually making them unavailable to wildlife species that depend on them. Factors considered in the delineation of corridors include topography, road density, presence of riparian areas, human developments and activities, vegetative cover and land ownership patterns (Craighead et al. 2002).

High and moderate quality corridors were combined on **Table 4-102** to show acres of road density in higher quality movement corridors. As with core and subcore habitat, roads on BLM lands can affect the quality of movement corridors on adjacent lands. At the Planning Area scale, travel management under Alternative A would maintain the fewest acres with low road density in high or moderate quality movement corridors of all the alternatives.

Approximately 28 percent (85,120 acres) of the Decision Area is considered to be in high or moderate quality wildlife corridors. As with the Planning Area, Alternative A would have the fewest BLM acres with low road density and Alternative C would have the most acres. The amount of BLM acres in low road density varies markedly between Alternative A and the action alternatives. Alternative A would have roughly 5,300 fewer BLM acres with low road density (47,226 total acres) than Alternative B and approximately 5,100 fewer acres than Alternative D (**Table 4-102**). Alternative D would have over 5,500 fewer BLM acres in low road density than Alternative C.

Table 4-102 High and Moderate Quality Corridors Approximate Acres by Road Density Category			
	Low Road Density (0-1)	Moderate Road Density (1-2)	High Road Density (>2)
Planning Area			
Alternative A	237,630	186,068	339,185
Alternative B	244,114	188,383	330,404
Alternative C	244,413	188,910	329,538
Alternative D	243,738	188,220	330,907
Decision Area			
Alternative A	47,226	17,513	20,386
Alternative B	52,580	18,371	14,163
Alternative C	52,756	18,912	13,447
Alternative D	52,359	18,211	14,533

Table 4-103 shows the acres of road density in low quality wildlife movement corridors (areas with more roads, less federal or state lands and more potential disturbance).

At the Planning Area scale, Alternative A would provide the fewest acres in low road density of all the alternatives.

Table 4-103 Low Quality Corridors Approximate Acres by Road Density Category			
	Low Road Density (0-1)	Moderate Road Density (1-2)	High Road Density (>2)
Planning Area			
Alternative A	323,877	221,390	291,595
Alternative B	326,503	221,534	288,780
Alternative C	329,363	219,489	287,952
Alternative D	325,217	222,315	289,295
Decision Area			
Alternative A	18,505	13,821	14,886
Alternative B	21,048	13,563	12,613
Alternative C	22,670	12,342	12,195
Alternative D	19,995	14,128	13,089

Approximately 16 percent (47,220 acres) of the Decision Area is considered to be in low quality wildlife corridors. As with the Planning Area scale, Alternative A would have the fewest BLM acres with low road density and Alternative C would have the most acres. Alternative A would have over 2,500 fewer BLM acres

with low road density (18,505 total acres) than Alternative B and approximately 1,500 fewer acres than Alternative D (**Table 4-103**). Alternative A would have approximately 4,200 fewer BLM acres with low road density than Alternative C.

Effects of Alternative B

Less motorized access would occur with Alternative B than Alternatives A or D, but Alternative B would provide more motorized access than Alternative C. Across the Field Office, there would be approximately 261 miles of open roads, 371 miles of closed and decommissioned roads and 156 miles open with seasonal restrictions. Seasonal restrictions would reduce the impacts of roads within important wildlife habitats such as big game winter range and spring habitat.

Riparian Habitat

Under Alternative B, there would be 71 miles of open roads and 34 miles of closed roads within a 300-foot riparian analysis area on BLM lands across the Field Office. Alternative B would have fewer open roads in riparian areas than under Alternative A. This alternative would also have fewer open roads compared to Alternative D but about 4 miles less than Alternative C. Alternative B would provide for improvement in riparian habitat at the Decision Area scale compared to Alternatives A and D, but would provide for less improvement than Alternative C.

Elk Winter Range

Table 4-104 displays road densities within elk winter range by Big Game Analysis Areas in the Decision Area. Alternative B would increase the number of acres with low road density in elk winter range in all Big Game Analysis Areas over Alternative A with the exception of Elkhorns (Alternatives B and A would be similar because a travel plan already exists for this area) and Big Belts. In the Big Belts, some roads that had temporary closures in the Ward Ranch area and in the area of the 2000 fires would be opened under Alternative B (East Helena TPA) **Table 4-104**.

Alternative B would have considerable increases in acres of low road density areas in the Granite Butte, Highlands, and Jefferson Big Game Analysis Areas over Alternative A. This alternative would have fewer acres in the low road density category in most Big Game Analysis Areas compared to Alternative C, especially in the Big Hole, Granite Butte, and Missouri Big Game Analysis Areas. Alternative B would have more acres in the low road density category in six Big Game Analysis Areas compared to Alternative D. The Big Game Analysis Areas with the largest differences between Alternatives B and D would be the Big Hole, Granite Butte, Highlands, and the Missouri.

Table 4-104
Decision Area Road Densities (mi/mi²) Within
Elk Winter Range by Big Game Analysis Area
Under Alternative B

Elk Winter Range Analysis Unit	Acres of Low Density	Acres of Moderate Density	Acres of High Density
Big Belts	1,969	2,295	2,425
Big Hole	14,537	4,872	3,607
Blackfoot	52	81	312
Clancy	1,919	3,321	5,614
Elkhorns	16,092	8,721	4,559
Granite Butte	5,289	4,536	7,875
Highlands	19,797	5,017	1,594
Jefferson	16,294	8,749	8,335
Missouri	20,849	2,250	932

Low Density - (0-1 mi/mi²), Moderate Density - (1-2 mi/mi²),
 High Density - (>2 mi/mi²)

Source: GIS Analysis

The amount of big game security habitat across all Butte Field Office BLM lands Decision Area-wide under Alternative B would be 8,510 acres (**Table 4-100**). This is about 2,664 acres more than under Alternative A and is the second highest total of security habitat acres of all four alternatives.

Core and Subcore Habitat

At the Planning Area scale, Alternative B would have approximately 9,000 more acres in low road density than Alternative A in core and subcore habitat (**Table 4-101**). The majority of core and subcore habitat at the Planning Area scale is predominately found on Forest Service lands. This displays how BLM roads can affect the quality of core and subcore habitat on adjacent federal, state, and private lands. BLM roads adjacent to other federal, state, or private lands with low road densities can degrade the quality of the adjacent habitat and reduce the use of those areas by wildlife. In the low road density category, Alternative B would provide approximately 3,500 more acres than Alternative D, but approximately 2,000 fewer acres than Alternative C.

Approximately 24 percent (71,600 acres) of the Decision Area is considered core or subcore habitat. Alternative B would have over 7,000 more BLM acres with low road density (40,458 total acres) than Alternative A, and 3,000 more acres than Alternative D. Alternative B would have about 1,600 fewer BLM acres in low road density than Alternative C (**Table 4-101**).

Wildlife Corridors

At the Planning Area scale, travel management under Alternative B would increase the amount of acres in low road density in high or moderate movement corridors by approximately 6,500 acres over Alternative A (**Table**

4-102). As a group, the action alternatives vary substantially from Alternative A but vary relatively slightly from each other. Alternative B would have only 300 fewer acres in the low road density category compared to Alternative C and only 400 more acres than Alternative D.

Approximately 28 percent (85,120 acres) of the Decision Area is considered to be in high or moderate quality wildlife corridors. Alternative B would have over 5,000 more BLM acres with low road density (52,580 total acres) than Alternative A and only 220 more acres than Alternative D. Alternative B would have slightly fewer BLM acres in low road density (200 acres) than Alternative C.

In the context of low quality wildlife movement corridors, at the Planning Area scale, travel management under Alternative B would increase the amount of acres with low road density compared to Alternatives A and D but would have fewer acres than Alternative C (**Table 4-103**). Alternative B would provide approximately 2,600 more acres of low road density than Alternative A, 1,300 more acres than Alternative D and approximately 2,900 acres less than Alternative C.

In the context of Decision Area lands, Alternative B would have over 2,500 more BLM acres with low road density (21,048 total acres) than Alternative A and 1,000 more acres than Alternative D. Alternative B would have approximately 1,600 fewer BLM acres in low road density than Alternative C (**Table 4-103**).

Effects of Alternative C

Less motorized access would occur with Alternative C than with any of the other alternatives. Across all Butte Field Office BLM lands, there would be approximately 244 miles of open roads, 425 miles of closed and decommissioned roads and 128 miles open with seasonal restrictions. Alternative C would have the greatest benefits to wildlife species from closed, decommissioned, and seasonally restricted roads of all other alternatives. Alternative C would increase the quality of habitat by reducing disturbance. The quantity of habitat would be increased by reducing fragmentation, allowing roads to become re-vegetated and preventing the spread of noxious weeds. Big game would have additional security habitat during the hunting season and wildlife would have additional refuge during critical seasons of use, such as during the winter or spring months, with Alternative C.

Riparian Habitat

Under the travel management, Alternative C would have 67 miles of open roads and 37.6 miles of closed roads within 300 feet of streams on BLM lands across the Field Office. Alternative C would have fewer miles of open roads and more miles of closed roads in riparian areas compared to the other alternatives; therefore, providing the most protection of riparian habitat.

Elk Winter Range

Table 4-105 displays the road densities within elk winter range by Big Game Analysis Areas in the Decision Area. Alternative C would increase the number of acres with low road density in elk winter range in most Big Game Analysis Areas over the other alternatives (**Table 4-105**).

Table 4-105 Decision Area Road Densities within Elk Winter Range by Big Game Analysis Area Under Alternative C			
Elk Winter Range Analysis Unit	Acres of Low Density	Acres of Moderate Density	Acres of High Density
Big Belts	2,195	2,088	2,405
Big Hole	15,070	4,680	3,265
Blackfoot	52	81	312
Clancy	1,921	3,322	5,610
Elkhorns	17,072	7,751	4,548
Granite Butte	6,445	4,637	6,617
Highlands	19,797	5,017	1,594
Jefferson	16,345	9,016	8,018
Missouri	21,903	1,969	159

Low Density - (0-1mi/mi²), Moderate Density - (1-2 mi/mi²), High Density - (>2 mi/mi²)
Source: GIS Analysis

Alternatives C and B would have the same or similar number of acres with low road density in the Blackfoot, Highlands, Jefferson and Clancy Big Game Analysis Areas. Alternative C would have more acres in the low road density category (up to 1,200 acres per Big Game Analysis Area) in the Big Belts, Big Hole, Elkhorns, Granite Butte and Missouri Big Game Analysis Areas compared to Alternative B. Alternative C would have considerable increases in acreage of low road density in the Big Hole, Granite Butte, Highlands, Jefferson and Missouri Big Game Analysis Areas over Alternative A. This alternative would have more acreage of low road density in seven Big Game Analysis Areas compared to Alternative D. The Big Game Analysis Areas with the largest differences between Alternatives C and D would be the Big Hole, Granite Butte, Highlands, and the Missouri.

The actual road density in elk winter range would be the lowest under Alternative C of all alternatives and this alternative would have more acreage of elk winter range in low road density than all other alternatives. Alternative C would do more than any other alternative to protect and restore big game winter range.

The amount of big game security habitat across all Butte Field Office BLM lands Decision Area-wide under Alternative C would be 10,946 acres (**Table 4-100**).

This is 5,100 acres more than under Alternative A and about 2,436 acres more than under Alternative B. Alternative C would provide the highest total of security habitat acres of all four alternatives.

Core and Subcore Habitat

At the Planning Area scale Alternative C would have approximately 11,000 more acres in the low road density category than Alternative A in core and subcore habitat (**Table 4-101**). Alternative C would provide more acreage of low road density than all other alternatives and would help to improve the quality and quantity of core and subcore habitat on other federal, state, and private lands more than all other alternatives.

Approximately 24 percent (71,600 acres) of the Decision Area is considered core or subcore habitat. Alternative C would have over 8,600 more BLM acres with low road density (42,043 total acres) than Alternative A, and 4,600 more BLM acres than Alternative D. Alternative C would also have 1,600 more BLM acres with low road density than Alternative B (**Table 4-101**).

Wildlife Movement Corridors

As with the core and subcore habitat, roads on BLM lands can affect the quality of movement corridors on adjacent lands. At the Planning Area scale, travel management under Alternative C would increase the amount of acreage with low road densities by approximately 6,780 acres over Alternative A (**Table 4-102**). Alternative C would have 300 acres more than Alternative B and 700 acres more than Alternative D in the low road density category.

Approximately 28 percent (85,120 acres) of the Decision Area is considered to be in high or moderate quality wildlife corridors. Alternative C would have over 5,500 more BLM acres with low road density (52,756 total acres) than Alternative A but only 400 more BLM acres than Alternative D. Alternative C would have 200 more BLM acres in low road density than Alternative B (**Table 4-102**).

Table 4-103 shows the acres of road density in low quality wildlife movement corridors. At the Planning Area scale, travel management under Alternative C would have the most acres in low road density of all alternatives. Alternative C would provide approximately 5,500 additional acres of low road density in low quality corridors over Alternative A and approximately 4,100 more than Alternative D. Alternative C would provide about 2,900 more acres in low road density than Alternative B.

Approximately 16 percent (47,220 acres) of the Decision Area is considered to be in low quality wildlife corridors. Alternative C would have over 4,100 more BLM acres with low road density (22,670 total acres) than Alternative A, and 2,700 more acres than Alternative D. Alternative C would have approximately

1,600 more BLM acres in low road density over Alternative B (Table 4-103).

Overall, Alternative C would provide the most suitable core and subcore habitat and wildlife movement corridors in both the Decision and Planning Areas.

Effects of Alternative D

Alternative D would allow more motorized access than the other action alternatives but less than Alternative A. Across all Butte Field Office BLM lands there would be approximately 305 miles of open roads, 309.6 miles of closed and decommissioned roads, and 174 miles of seasonally restricted roads. Fewer seasonal restrictions would increase impacts associated with travel and recreation within important wildlife habitat areas. Alternative D would have more open roads than the other action alternatives but fewer open roads than Alternative A.

Alternative D would have more negative and long-term effects on wildlife and wildlife habitat from permanent and open roads than Alternatives B and C but fewer effects than Alternative A.

Riparian Habitat

Under Alternative D, 74.6 miles of open roads and 30.2 miles of closed roads would be located within 300 feet of streams on BLM lands across the Butte Field Office. Alternative D would have more miles of open road in riparian areas compared to the other action alternatives but 13 miles less than Alternative A. Alternative D would have more negative effects from roads in riparian areas such as loss of riparian vegetation and habitat and disturbance than the other action alternatives, but fewer negative effects than Alternative A.

Elk Winter Range

Table 4-106 displays road densities within elk winter range by Big Game Analysis Areas in the Decision Area. Alternative D would increase the number of acres of low road density in elk winter range in all Big Game Analysis Areas over Alternative A with the exception of Elkhorns (Alternatives D and A would be similar because a travel plan already exists for this area) and Big Belts. In the Big Belts, some roads that had temporary closures in the Ward Ranch area and in the area of the 2000 fires would be opened under Alternative D (East Helena TPA). Alternative D would increase acres with low road density in the Granite Butte, Highlands and Jefferson Big Game Analysis Areas over Alternative A, but would have fewer acres in low road density in most Big Game Analysis Areas compared to Alternatives B and C. Alternative D would have fewer acres in low road density in six Big Game Analysis Areas compared to Alternative B, and in seven Big Game Analysis Areas compared to Alternative C. The Big Game Analysis Areas with the largest differences between Alternatives D and B would be the Big Hole, Granite Butte,

Table 4-106
Decision Area Road Densities Within Elk Winter Range by Big Game Analysis Area Under Alternative D

Elk Winter Range Analysis Unit	Acres Low Density	Acres Moderate Density	Acres High Density
Big Belts	1,583	2,158	2,947
Big Hole	13,335	5,888	3,793
Blackfoot	52	79	314
Clancy	1,919	3,321	5,614
Elkhorns	16,092	8,720	4,559
Granite Butte	4,287	4,796	8,616
Highlands	18,841	5,778	1,789
Jefferson	16,248	8,412	8,719
Missouri	20,243	2,062	1,726

Low Density - (0-1 mi/mi²), Moderate Density - (1-2 mi/mi²), High Density - (>2 mi/mi²)

Source: GIS Analysis

Highlands, and the Missouri. This same relative difference comparison applies between Alternatives D and C.

The amount of big game security habitat across all Butte Field Office BLM lands Decision Area-wide under Alternative D would be 7,007 acres (Table 4-100). This is approximately 1,161 acres more than under Alternative A but is the lowest number of security habitat acres of the action alternatives.

Core and Subcore Habitat

At the Planning Area scale, Alternative D would have approximately 5,500 more acres in the low road density category than Alternative A in core and subcore habitat (Table 4-101). Alternative D would provide about 3,500 fewer acres in the low road density category than Alternative B and about 5,500 fewer acres in this category than Alternative C.

Approximately 24 percent (71,600 acres) of the Decision Area is considered core or subcore habitat. Alternative D would have over 4,000 more BLM acres with low road density (37,442 total acres) than Alternative A, and 3,000 fewer acres than Alternative B. Alternative D would have approximately 4,600 fewer BLM acres in low road density than Alternative C (Table 4-101).

Wildlife Movement Corridors

At the Planning Area scale, travel management under Alternative D would increase the amount of acres with low road density in high and moderate quality movement corridors by approximately 6,100 acres over Alternative A (Table 4-102). Alternative D would have only 700 fewer acres in low road density compared to

Alternative C and only 400 fewer acres than Alternative B.

Approximately 28 percent (85,120 acres) of the Decision Area is considered to be in high or moderate quality wildlife corridors. Alternative D would have over 5,100 more BLM acres with low road density (52,359 total acres) than Alternative A and only 220 fewer acres than Alternative B. Alternative D would have approximately 400 fewer BLM acres in low road density than Alternative C (Table 4-102).

Table 4-103 shows the acres of road density in low quality wildlife movement corridors (areas with more roads, less federal or state lands and more potential disturbance). At the Planning Area scale, travel management under Alternative D would increase the amount of acres with low road density compared to Alternative A but would have fewer acres in this category than Alternatives B and C. Alternative D would provide approximately 1,300 more acres of low road density than Alternative A, but 1,300 less than Alternative B and approximately 4,100 less than Alternative C.

Approximately 16 percent (47,220 acres) of the Decision Area is considered to be in low quality wildlife corridors. Alternative D would have over 1,500 more

BLM acres with low road density (19,995 total acres) than Alternative A and 1,000 fewer acres than Alternative B. Alternative D would have approximately 1,000 fewer BLM acres in low road density than Alternative C (Table 4-103).

FISH

Watershed function and roads within 300 feet of streams were used as indicators of the combined impacts of the five site-specific travel plans considered together at the scale of all BLM lands in the Butte Field Office. Relative comparisons of alternatives would apply to effects described for fish habitat in the TPA-specific analyses.

Effects of Alternative A

Table 4-107 displays acreage of land by major watersheds in the Decision Area (all Butte Field Office BLM lands) in different road density classes (low, medium, and high). Alternative A would have the greatest detrimental effects to watershed function and subsequently fish habitat, compared to the other alternatives. Alternative A would maintain the most BLM acres with high density roads (107,566 acres) and the fewest BLM acres with low density roads (116,236 acres) of all other alternatives (Table 4-107).

Table 4-107 Decision Area Acres in Road Density Categories by Alternative by Watershed												
Road Density	Low (0-1 mi/mi ²)				Moderate (1-2 mi/mi ²)				High (>2 mi/mi ²)			
Alternative	A	B	C	D	A	B	C	D	A	B	C	D
Big Hole	20,426	27,498	32,286	23,198	16,812	17,382	15,490	19,575	23,946	16,305	13,408	18,411
Blackfoot	186	230	230	191	147	156	156	155	1,277	1,223	1,223	1,263
Boulder	16,467	17,684	18,023	17,616	11,145	11,727	12,410	11,142	13,321	11,523	10,500	12,176
Jefferson	13,763	14,270	14,270	14,194	11,983	11,834	11,834	11,893	14,583	14,224	14,224	14,242
Madison	822	822	822	822	387	387	387	387	189	189	189	189
Upper Clark Fork	0	0	0	0	0	0	0	0	0	0	0	0
Upper Missouri River	58,823	65,729	69,884	61,303	35,783	38,863	37,321	38,354	53,615	43,630	41,017	48,565
Upper Yellowstone	5,749	5,749	5,749	5,749	1,918	1,918	1,918	1,918	635	635	635	635
Total	116,236	131,982	141,264	123,073	78,175	82,267	79,516	83,424	107,566	87,729	81,196	95,481

Table 4-108 and **Table 4-109** display miles of open and closed road within 300 feet of streams. The number of open road miles within 300 feet of streams on BLM lands would be greatest under Alternative A (87.7 miles) of all the alternatives. Alternative A would provide for the greatest mileage of riparian roads by each subcategory as well: 39.9 miles near fish bearing streams, 21.5 miles near perennial non-fish bearing streams, and 26.3 miles near intermittent streams. The miles of closed roads in riparian areas would be the least under Alternative A (17.1 miles) with the same trend being the case where Alternative A would provide for the fewest closed riparian roads by sub-category of all alternatives.

Effects of Alternative B

Alternative B would have more acres with low density roads across the Decision Area (131,982 acres) compared to Alternative A (116,236). In the moderate

road density category, Alternative B has nearly 4,000 more acres compared to Alternative A and almost 20,000 acres less in the high road density than Alternative A (**Table 4-107**). The most marked differences between alternatives would be in the Big Hole, Boulder, Jefferson, and Upper Missouri watersheds. For the five site-specific travel plans considered in aggregate at the Field Office scale, Alternative B would provide improved watershed function and reduced road-related impacts to fish habitat than Alternative A.

Under Alternative B there would be approximately 20 percent fewer open road miles within 300 feet of streams than under Alternative A (**Table 4-108**). Alternative B would provide for about 16.8 more miles of closed road within 300 feet of streams than Alternative A (**Table 4-109**). Differences between alternatives would be in the Big Hole, Boulder, and Upper Missouri River watersheds where more riparian roads would be closed

Table 4-108																
Miles of Open Roads within 300 Feet of Streams																
	Fish-bearing				Perennial				Intermittent				Total Open Roads			
Watershed	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Big Hole	13.6	12.8	11.9	12.9	6.5	3.4	3.0	4.0	10.6	6.0	4.9	7.5	30.7	22.2	19.8	24.4
Jefferson	2.6	2.6	2.6	2.6	0.6	0.6	0.6	0.6	4.1	4.1	4.1	4.1	7.3	7.3	7.3	7.3
Boulder	5.8	5.0	4.7	5.0	5.6	5.5	5.4	5.4	4.6	2.2	2.2	2.6	16	12.7	12.3	13
Madison	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Missouri River	16.1	14.8	14.8	15.4	8.4	6.7	6.5	6.9	6.6	5.0	4.8	5.5	31.1	26.5	26.1	27.8
Upper Yellowstone	1.2	1.2	1.2	1.2	0.4	0.4	0.4	0.4	0	0	0	0	1.6	1.6	1.6	1.6
Upper Clark Fork	0.6	0.4	0	0.4	0	0	0	0	0.4	0.1	0	0.1	1.0	0.5	0	0.5
Blackfoot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	39.9	36.8	35.2	37.5	21.5	16.6	15.9	17.3	26.3	17.4	16	19.8	87.7	70.8	67.1	74.6

Table 4-109																
Miles of Closed Roads within 300 Feet of Streams																
	Fish-bearing				Perennial				Intermittent				Total Closed Roads			
Watershed	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Big Hole	0.3	1.1	2.0	1.0	0.1	3.2	3.6	2.6	0.7	5.3	6.4	3.8	1.1	9.6	12.0	7.4
Jefferson	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	1.4	1.4	1.4	1.4
Boulder	1	1.8	2.1	1.8	0	0.1	0.2	0.2	0	2.4	2.4	2.0	1	4.3	4.7	4
Madison	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Missouri River	4.2	5.4	5.4	4.9	5.2	6.9	7.1	6.7	4.2	5.8	6.0	5.3	13.6	18.1	18.5	16.9
Upper Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Clark Fork	0	0.2	0.6	0.2	0	0	0	0	0	0.3	0.4	0.3	0	0.5	1.0	0.5
Blackfoot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6.0	9.0	10.6	8.4	5.8	10.7	11.4	10.0	5.3	14.2	15.6	11.8	17.1	33.9	37.6	30.2

under Alternative B than Alternative A in every case and in every subcategory of riparian areas (fish bearing streams, perennial non-fish bearing streams, intermittent streams). Alternative B would have fewer road-related adverse effects to fish and aquatic habitats than Alternative A associated with roads in and near riparian areas.

Overall, at the scale of all BLM lands in the Butte Field Office, Alternative B would pose fewer road-related adverse effects to fish and aquatic habitats than Alternative A, and would actually lessen existing impacts to improve aquatic habitats.

Effects of Alternative C

Alternative C would have the most BLM acres with low density roads (141,264 acres) compared to all other alternatives. This alternative would have 25,000 acres more in the low road density category and 26,000 fewer acres in the high road density category compared to Alternative A (Table 4-107). This alternative would have 9,282 more BLM acres in the low road density category and 6,500 fewer acres in the high road density category than Alternative B (Table 4-107). Alternative C would have the fewest acres with high road densities of all alternatives with the watersheds seeing the most effects being the Big Hole, Boulder, and Upper Missouri River.

For the five site-specific travel plans considered in aggregate at the Field Office scale, Alternative C would provide the greatest degree of improved watershed function and reduced road-related impacts to fish habitat of all alternatives.

Under Alternative C there would be approximately 23 percent fewer open road miles within 300 feet of streams on BLM lands than under Alternative A (Table 4-108). Alternative C would provide for approximately 20 more miles of closed road within 300 feet of streams than Alternative A and about 3.7 more miles than Alternative B (Table 4-109). Differences between alternatives would be in the Big Hole, Boulder, and Upper Missouri River watersheds where more riparian roads would be closed under Alternative C than any other alternative in all riparian categories. Alternative C would have fewer road-related adverse effects to fish and aquatic habitats associated with roads in and near riparian areas than any other alternative. Overall, at the scale of all BLM lands in the Butte Field Office, Alternative C would pose fewer road-related adverse effects to fish and aquatic habitats than all other alternatives, and would actually lessen existing impacts to improve aquatic habitats more than any other alternative.

Alternative D

Alternative D would provide fewer acres with low density roads (123,073 acres) across the Decision Area compared to Alternatives B and C, but more acres than Alternative A (116,236 acres). Of the action alternatives,

Alternative D would have the most acres with high road density (95,481 acres) but moderate road densities would be similar for both Alternatives D and B (Table 4-107). Alternative D would have roughly 12,000 fewer acres with high road density than Alternative A. For the five site-specific travel plans considered in aggregate at the Field Office scale, Alternative D would provide improved watershed function and reduced road-related impacts to fish habitat compared to Alternative A, but more adverse effects than either Alternative B or C.

Under Alternative D there would be approximately 17 percent fewer open roads within 300 feet of streams than under Alternative A, 5 percent more than under Alternative B, and 10 percent more than under Alternative C (Table 4-108). Alternative D would provide for approximately 13 more miles of closed road within 300 feet of streams than Alternative A, 3.7 fewer miles than Alternative B, and 7.4 fewer miles than Alternative C (Table 4-109). Alternative D would have fewer road-related adverse effects to fish and aquatic habitats associated with roads in and near riparian areas than Alternative A, but more than Alternatives B and C.

Alternative D would close and decommission fewer roads during travel management than Alternatives B and C but more than Alternative A.

Overall, at the scale of all BLM lands in the Butte Field Office, Alternative D would pose fewer road-related adverse effects to fish and aquatic habitats than Alternative A, but would pose greater impacts than Alternatives B or C. Alternative D would lessen existing impacts to improve aquatic habitats compared to the current condition of Alternative A.

SPECIAL STATUS PLANTS

The following discussion summarizes contributions to cumulative effects on special status plants associated with BLM road management at the scale of all BLM lands in the Butte Field Office. Specific mechanisms of effect on special status plants tie back to effects described for TPA-specific discussions above, particularly in the Effects Common to All Alternatives sections of those discussions.

Since BLM roads make up about 4.8 percent of all roads and BLM lands make up 4.2 percent of all lands in the Planning Area, effects of BLM travel planning alternatives on special status plants at the RMP Planning Area scale would be minor. Activities and effects discussed above for each TPA on private lands (48 percent of lands, 63 percent of roads in Planning Area) and other public lands (42 percent of lands, 29 percent of roads in Planning Area) would have a stronger influence on special status plants in the Planning Area with activities on private lands likely having the greatest effect overall.

Effects of the Alternatives

Under Alternative A the greatest amount of BLM road use (629 open miles or 3.5 percent of all roads in the RMP Planning Area) would be possible, causing the greatest amount of special status plant habitat to be at risk. Habitat would be at risk because of greater ground disturbance and increased weed spread which reduces connectivity between populations, increases competition from invasive species, and increases plant mortality.

Under Alternative B, 417 BLM road miles (2.3 percent of all roads in the RMP Planning Area) would be open, reducing adverse effects to special status plants compared to Alternative A.

Under Alternative C, 372 BLM road miles (2.1 percent of all roads in the RMP Planning Area) would be open. Alternative C would reduce adverse effects to special status plants more than any other alternative.

Under Alternative D, 479 BLM road miles (2.7 percent of all roads in the RMP Planning Area) would be open. Alternative D would reduce adverse effects to special status plants more than Alternative A, but less than Alternatives B and C.

WILDLAND FIRE MANAGEMENT

Effects referenced below are described in more detail in the Wildland Fire Management sections of each of the five specific TPA discussions above. The contribution of the five site-specific travel plans are discussed in aggregate at the Decision Area (all BLM lands in the Butte Field Office) and Planning Area scales below.

The following conditions would apply to closed BLM roads under all alternatives. Many closed roads would still be available for use in fire suppression as well as fuels reduction treatments. Planning and implementation of fuels reduction treatments could occur in association with closed roads if variances for temporary road use were to be allowed. Variances would be subject to internal BLM review.

Effects of Alternative A

Alternative A would leave the most miles of road (629 miles) available for public use (open yearlong and open with seasonal restrictions) of Butte Field Office BLM lands. Roads open to the public can provide benefits for wildland fire suppression by providing access that is usually passable (not overgrown with vegetation or closed by small rock slides, etc.) and allowing access for fuel reduction treatments. Alternative A would provide the most open road miles in the DA and would therefore provide the most benefits of all alternatives for fire suppression access as well as allowing ready access for fuels reduction projects.

Roads open to the public also provide additional opportunities for human-caused fire ignitions (either accidental or intentional). Human activities are the

leading source of wildland fire ignition in the Planning Area. Alternative A would contribute the most open road miles of all alternatives from which these fire starts could occur and would therefore provide the greatest overall risk of human-caused fire starts.

At the Planning Area scale, the 629 miles of open BLM roads would make up about 3.5 percent of the at least 17,810 road miles in the entire Planning Area. The contribution of BLM roads is minor at the Planning Area scale, indicating that road management and activities off BLM lands have much more influence on future wildland fire characteristics at this scale than BLM road management.

Effects of Alternative B

Alternative B would leave 417 miles of BLM road available for public use (open and seasonally restricted), slightly more than Alternative C, but 34 percent less than the 629 miles available under Alternative A. Alternative B would provide fewer open road miles in the DA than Alternative A and would therefore have fewer benefits than Alternative A for fire suppression access as well as allowing ready access for fuels reduction projects.

Roads open to the public also provide additional opportunities for human-caused fire ignitions (either accidental or intentional). Human activities are the leading source of wildland fire ignition in the Planning Area. Alternative A would contribute fewer open road miles than Alternative A from which these fire starts could occur and would therefore provide less risk of human-caused fire starts than Alternative A.

At the Planning Area scale, the 417 miles of open BLM roads would make up about 3.5 percent of the at least 17,810 road miles in the entire Planning Area. The contribution of BLM roads is minor at the Planning Area scale, indicating that road management and activities off BLM lands have much more influence on future wildland fire characteristics at this scale than BLM road management.

Effects of Alternative C

Alternative C would leave 372 miles of road available for public use (open yearlong and open with restrictions), slightly less than Alternative B, but 41 percent less than the 629 miles available in Alternative A. Alternative C would provide the least open road miles in the DA of any alternative and would therefore provide the least benefit of all alternatives for fire suppression access as well as allowing ready access for fuels reduction projects.

Roads open to the public also provide additional opportunities for human-caused fire ignitions (either accidental or intentional). Human activities are the leading source of wildland fire ignition in the Planning Area. Alternative C would contribute fewer open road

miles than any other alternative and would therefore provide the least risk of human-caused fire starts than any other alternative.

At the Planning Area scale, the 372 miles of open BLM roads would make up about 2.1 percent of the at least 17,810 road miles in the entire Planning Area. The contribution of BLM roads is minor at the Planning Area scale, indicating that road management and activities off BLM lands have much more influence on future wildland fire characteristics at this scale than BLM road management.

Effects of Alternative D

Alternative D leaves 479 miles of road available for public use (open yearlong and open with restrictions), slightly more than Alternatives B and C, but 24 percent less than the 629 miles available in Alternative A. Alternative D would provide fewer open road miles in the DA than Alternative A, but more than either Alternatives B or C and would therefore have fewer benefits than Alternative A but more benefits than Alternatives B and C for fire suppression access as well as allowing ready access for fuels reduction projects.

Roads open to the public also provide additional opportunities for human-caused fire ignitions (either accidental or intentional). Human activities are the leading source of wildland fire ignition in the Planning Area. Alternative D would contribute fewer open road miles than Alternative A, but more miles than either Alternatives B or C from which these fire starts could occur. Alternative D would provide less risk of human-caused fire starts than Alternative A, but more risk than Alternatives B and C.

At the Planning Area scale, the 479 miles of open BLM roads would make up about 2.7 percent of the at least 17,810 road miles in the entire Planning Area. The contribution of BLM roads is minor at the Planning Area scale, indicating that road management and activities off BLM lands have much more influence on future wildland fire characteristics at this scale than BLM road management.

CULTURAL AND PALEONTOLOGICAL RESOURCES

At the scale of either the RMP Planning Area or the RMP Decision Area, alternative-specific risks or impacts to cultural and paleontological resources are difficult to discern due to a lack of extensive site-specific knowledge about the presence of these resources in a given TPA. By designating open routes, limiting open-country travel, and closing some routes, inadvertent discovery of cultural and paleontological resources and vandalism to them is reduced. Higher road densities in a given area would allow greater access to more land on the average, but that does not imply greater amounts of

vandalism, since the vehicles would remain on designated routes.

VISUAL RESOURCES

The following discussion characterizes effects to visual resources at the scale of all Butte Field Office BLM lands. Road mileages depicted are for all BLM lands in the RMP Decision Area with the alternatives of the five site-specific travel plans incorporated.

Effects Common to All Alternatives

Roads (temporary or permanent) may affect visual quality. Roads that remain open for public use may impact visual qualities where noticeable. The quantity of open roads would also influence sensitivity levels since with more open roads, more areas would generally be viewed by more members of the public. Closing or decommissioning roads would generally reduce effects to visual resources and reduce sensitivity levels because fewer members of the public would generally be accessing and viewing areas with closed roads.

Effects of the Alternatives

Alternative A would have the most miles of open road (approximately 629 miles) Butte Field Office-wide. This would create the most adverse effects to visual resources of all alternatives from a standpoint of both direct impacts of roads and creating the most potential for sensitive viewpoints.

Under Alternative B, reducing the mileage of designated open routes Field Office-wide to 417 miles would enhance scenic qualities and reduce sensitive viewpoints compared to Alternative A.

Under Alternative C, adverse effects from travel management and transportation would be slightly less than those of Alternative B with respect to impacts from open roads (372 open miles) on the landscape. Alternative C would improve visual resources the most of any alternative.

Under Alternative D, impacts from travel management would be less than with Alternative A, but greater than with Alternatives B and C. Alternative D would have 150 fewer miles of open road (479 open miles) than Alternative A. This reduction would lower sensitive viewpoints and the noticeability of landscape changes. Alternative D would have more adverse impacts to visual resources than Alternatives B and C.

Under all alternatives, most activities on BLM lands would generally not adversely affect visual resources to unacceptable degrees because discretionary activities on BLM lands would be required to meet Visual Resource Management objectives within individual project areas.

Activities on non-BLM lands, particularly activities near BLM lands associated with residential development, urbanization, additional mining, or vegetation

management, could have adverse cumulative effects on visual resources on BLM lands because BLM VRM objectives would not apply to non-BLM activities.

LIVESTOCK GRAZING

At the RMP Planning Area scale, contributions to cumulative effects on livestock grazing from alternatives for the five site-specific travel plans would be similar for all action alternatives. All action alternatives would close and decommission more roads and trails than Alternative A. As more roads and trails are closed, noxious and invasive weed spread along with multiple user conflicts would be reduced. On the other hand, permittee management time on BLM lands may increase. Consequently, more effects associated with closed roads as described under the Effects Common to All Alternatives sections for each TPA above would occur under Alternative C than under any other alternative. Alternative B would produce fewer effects than Alternative C, but more than Alternatives A and D. A summary of the relative degree of proposed road closures at the RMP Decision Area scale (all BLM Butte Field Office lands) as well as the Planning Area scale by alternative is below.

Under current conditions (Alternative A), approximately 172 miles of motorized routes mapped on the BLM transportation system would remain closed. These routes represent about 20 percent of the approximately 856 BLM road miles, and approximately 1.0 percent of the road miles across all ownerships in the entire Planning Area.

Alternative B would close (318 miles) or decommission (53 miles) approximately 371 miles of routes in the Decision Area currently open to use by motorized vehicles, the second most of any alternative. These routes represent about 43 percent of the approximately 856 BLM road miles in the Decision Area, and approximately 2.1 percent of the road miles across all ownerships in the entire Planning Area.

Alternative C would close (375 miles) or decommission (50 miles) approximately 425 miles of routes currently open to use by motorized vehicles. These routes represent about 50 percent of the approximately 856 BLM road miles in the Decision Area, and approximately 2.4 percent of the road miles across all ownerships in the entire Planning Area.

Alternative D would close (266 miles) or decommission (44 miles) approximately 310 miles of routes currently used by motorized vehicles. These routes represent about 36 percent of the approximately 856 BLM road miles in the Decision Area, and 1.7 percent of the road miles across all ownerships in the entire Planning Area.

RECREATION

Effects of the alternatives for the five site-specific travel plans on Recreation are discussed at the scale of the

Butte Field Office below. The public often targets public lands for various recreational activities. At the scale of the 7.2 million-acre RMP Planning Area, the 302,000 acres of Decision Area lands make up about 4.2 percent of the total. Recreation opportunities on other public lands at the scale of the entire RMP Planning Area exist on approximately 2,803,359 acres of USFS lands (39 percent of all lands), approximately 318,000 acres of state lands (4.4 percent of all lands), approximately 11,466 acres of Bureau of Reclamation lands (0.2 percent of all lands), and approximately 150,000 acres of National Park Service lands (2 percent of all lands). BLM lands make up about 8.4 percent of public lands in the RMP Planning Area available for public recreation.

Effects of Alternative A

This alternative would maximize motorized recreation opportunities, and minimize non-motorized opportunities within the five Travel Planning Areas (Helena, East Helena, Lewis & Clark-NW, Boulder/Jefferson City and Upper Big Hole) compared to the other alternatives. Approximately 372 miles of open road (including seasonally restricted roads) would be available in the five TPAs analyzed. This would provide approximately 629 miles of open road available across all Butte Field Office BLM lands.

Effects of Alternative B

Road availability for wheeled motorized travel within the five TPAs being analyzed would be the second lowest of all alternatives (approximately 171 miles open yearlong or open with restrictions, 417 miles Butte Field Office wide). Under this alternative motorized recreation users would be more affected than under Alternative A while visitors seeking non-motorized opportunities would be benefited with more walk-in areas associated with closed roads or from established trailheads.

Effects of Alternative C

Road availability for wheeled motorized travel within the five TPAs being analyzed would be the lowest of any of the alternatives (approximately 122 miles open yearlong or open with restrictions, 372 miles Butte Field Office wide). Under this alternative motorized recreation users would be most affected while visitors seeking non-motorized opportunities would be benefited the most.

Effects of Alternative D

This alternative would provide the second highest mileage of available roads (230 miles in the five TPAs, 479 miles Butte Field Office wide) of all alternatives for wheeled motorized recreation opportunities within the five Travel Plan Areas (Helena, East Helena, Lewis & Clark-NW, Boulder/Jefferson City and Upper Big Hole) analyzed as part of this planning effort. Motorized recreation users would have more opportunities than under Alternatives B and C, but fewer opportunities than under Alternative A. Non-motorized users would have

more opportunities than under Alternative A but fewer than under Alternatives B and C.

TRAVEL MANAGEMENT AND ACCESS

To understand the entire cumulative effects picture for travel management and access at the Decision Area and Planning Area scales, past travel management actions, recent travel planning decisions and effects of the five site-specific travel plans are important.

Past Travel Management Actions

Beginning in 1946, and continuing up to June 2003, the majority of lands managed by the BLM were managed under the “open” area designation. With some exceptions, under this management, the public was allowed to travel off-road (cross country) on motorized vehicles (both wheeled and snowmobiles) without restriction. During the initial decades under this management (1950-1980), the level of off-road motorized recreation use, adverse resource impacts, and user conflicts were relatively low. In more recent years (1980’s to the present), the Butte Field Office (as well as the rest of the nation) has experienced a dramatic increase in the popularity of Off Highway Vehicle recreation. According to a 1995 U.S. Bureau of Census abstract report for recreational use on public lands (U.S. Census Bureau. 1995), off-highway vehicle travel increased 138 percent between the years of 1982-1992, while other forms of motorized travel increased 186 percent. From 1997 to 2001, the number of ATVs in use increased by almost 40 percent (USDA-FS. 2005b). Nationwide, motorized enthusiasts are buying OHVs at a rate of 1,500 units per day, with nearly one-third of them doing so as first time buyers. Non-motorized use increased as well. According to the U.S. Bureau of Census report, between the years of 1982-1992, non-motorized travel increased 290 percent. As a result, both nationally and at the scale of the Butte Field Office, user conflicts between motorized and non-motorized users have increased.

In 2003, BLM issued a major travel management document, the *2003 Off-Highway Vehicle Record of Decision* and plan amendment for Montana, North Dakota, and portions of South Dakota. Under this decision, all wheeled motorized use is restricted to existing roads and trails only (no cross country use), including big game retrieval, unless in an area with a site-specific travel plan that manages otherwise.

Prior to the recent Butte RMP revision roads/trails inventory, the total number of roads and trails located within the Butte Field Office was generally considered to be 285 miles. This figure has been used for many years by BLM personnel, and represents the primary roads and trails used by the public and agency over the past 20-30 years. During the comprehensive road and trails inventory conducted for the Butte RMP (2002-2004), a total of approximately 856 miles of roads and

trails were documented. There is no data available to analyze when or at what rate this growth of the road network occurred (from 285 to 856 miles), or the numbers of miles of roads/trails that are attributed to agency development, versus public development (user made routes). The current total mileage is a combination of both BLM construction and user made routes that BLM never intended to place on the landscape. In some cases, the locations of existing routes and the (vehicle) type, frequency, and season of use, have resulted in resource impacts. This legacy of past travel management has a direct impact on current as well as future travel management.

Recent BLM Travel Plan Decisions

Recent BLM travel planning decisions for four TPAs in the Butte Field Office reflect a general trend of reduced motorized use with more distinction made in designated uses compared to the past (**Table 4-110**). While mileages of road open year-round have generally decreased, miles of seasonally restricted routes, miles of motorized trail for OHVs and motorcycles, and miles of closed roads have generally increased.

Outside of but adjacent to the Butte RMP Planning Area, the Dillon BLM Resource Management Plan (February 2006) provides another example of a recent travel management decision. Prior to its recent travel management revisions, the Dillon Field Office had 1,860 miles of road open yearlong, 242 miles open with seasonal restrictions, and 822,284 acres of area in the “Open” area designation for snowmobile use. With the travel plan revisions made in the Dillon RMP, there are now 1,183 road miles open yearlong, 159 miles with seasonal restrictions, and 763,057 acres in the “Open” area designation for snowmobile use.

Recent USFS Travel Plan Decisions

There have been two recent travel plan decisions made by the USFS on National Forest lands that are partially located within the Butte RMP Planning Area boundary. The North Belts Travel Plan completed in 2005 on the Helena National Forest applies to lands northeast of Canyon Ferry Reservoir. Some of these lands are within the Butte RMP PA boundary while others are outside the PA boundary. This decision has resulted in fewer combined miles of open motorized routes from 415 miles to 345 miles, and a reduction of open area for cross-country snowmobile use (**Table 4-111**).

The Gallatin National Forest travel plan, a Forest-wide effort completed in 2006, applies to approximately 2.8 million acres within the Butte RMP Planning Area as well as USFS lands outside the Planning Area. This decision increased the miles of routes available for winter driving, snowmobile use, and cross-country skiing (**Table 4-112**).

Table 4-110
Comparison of Past and Present Travel Management For Existing Butte Field Office Travel Planning Areas

Butte Field Office Travel Planning Area; (Plan Date)	Plan Status (Before/ After Plan)	Open Yearlong	Seasonally Restricted	Closed	Motorized trails	Non-motorized trails	Open Area for Wheeled Vehicles	Open Area Designation for Snowmobiles
Whitetail-Pipestone (2002)	Before	99.4	0	1.7	0	0	28,647	28,647
	After	51	22	32	20.2	0	0	0
Clancy-Unionville (2000)	Before	14	0	0	15	0	5,590	5,590
	After	5	4	5	14	0	0	1,350
Sleeping Giant (2004)	Before	29	0	0	0	0	7,463	7,463
	After	4.5	4.5	20	0	0	0	0
Elkhorn Mountains¹ (1995)	Before	0	1,036	0	32	Data unavailable	125,900	125,900
	After	0	708	328	151	Data unavailable	31,400	31,400

¹The data for the Elkhorn Mountains travel management plan includes both BLM and USFS managed lands.

Table 4-111
Comparison of Past and Present Travel Management Route Miles for the North Belts Travel Planning Area on the Helena National Forest

Plan Status	Open Roads, Passenger	Dual Use	Motorcycle Trails	Motorized Trails	Snowmobile Only Trail	Snowmobile Open Area Designation
Before	370	0	2	40	3	113,550
After	160	125	14	43	3	63,686

Table 4-112
Summary of Winter Opportunities by Miles Gallatin National Forest (Forest Wide Plan)
 (all mileages are approximate)

Use Type	Before Plan	After Plan
Pleasure Driving	162	169
Snowmobiling	400	468
Cross-Country Skiing	214	231

For summer use, the total miles of routes available for all motorized uses combined increased slightly from 1,577 miles to 1,588 miles, but included shifts in types of uses with mileage increases for pleasure driving and motorcycle riding, and miles reductions for backcountry roads and ATV routes (Table 4-113). Combined totals of routes where non-motorized uses were either emphasized or allowed reduced from 7,509 miles to 5,775 miles with reductions in routes where mountain bike and pack and stock saddle uses were emphasized, and increases in miles where mountain bike use is allowed (but not emphasized).

Table 4-113
Summary of Summer Opportunities by Road/Trail Miles, Gallatin National Forest (Forest Wide Plan)
 (all mileages are approximate)

Plan Status	Pleasure Driving	Backcountry Roads (4 X 4)	ATV	Motorcycle	Mountain Bike Use emphasized	Mountain Bike Use allowed	Pack and Stock Saddle Use emphasized	Pack and Stock Saddle Use allowed	Hiking Use emphasized
Before Plan	309	417	757	74	2,386	898	2,115	1	2,109
After Plan	402	337	554	295	1,323	1,754	347	347 ¹	2,004 ²

¹ Use for this activity is prohibited on some trails.

² Use for this activity is not prohibited on any trails; use is either emphasized or allowed.

Effects of Five Site-Specific Travel Plans at RMP Decision Area Scale

This section discusses effects of the alternatives of the five site-specific travel plans considered in aggregate at the RMP Decision Area (all Butte Field Office BLM lands) scale as well as the Planning Area scale. **Table 4-114** displays RMP Decision Area-wide road mileages by alternative.

Effects of Alternative A

Under Alternative A, approximately 629 miles of roads would be open (471.8 miles open yearlong, 157.5 miles open with seasonal restrictions) Decision Area-wide for motorized use opportunities (**Table 4-114**). This would be the greatest number of open miles of all the alternatives and would create the most opportunities for motorized users, and the least opportunities for non-motorized users of all alternatives. Approximately 172 miles of road (approximately 20 percent of Field Office total of 856 miles) would remain closed Field Office-wide under this alternative.

Table 4-114				
Status of Transportation System at the Field Office Scale by Alternative (in miles)				
Indicator	Alt A	Alt B	Alt C	Alt D
Miles of open yearlong routes	471.8	261.0	244.3	304.8
Miles of seasonally restricted routes	157.5	155.9	128.1	173.9
Miles of decommissioned routes	0	53.4	50.1	43.4
Miles of closed routes	172.0	317.5	375.2	266.2

Source: BLM Butte Field Office transportation GIS database, 2005.

Under Alternative A, user conflicts would be greater and safety would be reduced compared to the action alternatives because motorized and non-motorized users would share more of the same routes, which could lead to accidents and injuries.

Management costs under Alternative A would be mixed. Less personnel time would be required to monitor travel compliance than under the action alternatives. However, more effort would be required for signing designated open routes than under any other alternative (routes open yearlong and open with restrictions would be signed while closed routes would not be signed).

Effects of Alternative B

Under Alternative B, opportunities for wheeled motorized access would be less, while opportunities for non-motorized user would be greater than under

Alternative A (**Table 4-114**). Under Alternative B, approximately 44 percent of the current total of approximately 856 road miles would be closed or decommissioned. Alternative B would provide fewer opportunities for motorized users, but would increase opportunities for non-motorized users compared to Alternative A.

Under Alternative B, wheeled motorized and non-motorized users would have more separate routes than under Alternative A. User conflicts would be reduced compared to Alternative A.

The extent of management activities and costs under Alternative B would be mixed. Less personnel time would be required for initial implementation (signing designated routes, installing bulleting boards) than under Alternative A, but more time would be needed than under Alternative C. However, more effort on the part of the BLM would be required for public education and travel plan compliance than under Alternative A, but less time would be needed for this than under Alternative C.

Effects of Alternative C

Under Alternative C, opportunities for wheeled motorized access would be less, while opportunities for non-motorized users would be greater than under any other alternative (**Table 4-114**). Under Alternative C approximately 49 percent of all BLM roads in the Decision Area would be closed or decommissioned.

User conflicts may be less under Alternative C than the other alternatives because wheeled motorized and non-motorized users would have a greater number of separate routes, thereby reducing the chances of encounters.

The extent of management activities and costs under Alternative C would be mixed. More personnel time would be required to monitor user compliance than under Alternatives A and B, but signage requirements would be less than under any other alternative due to Alternative C having the fewest open routes.

Road and trail safety would be greater under Alternative C than under all other alternatives. Increased opportunities for dispersed recreation would result in a reduction in accidents and injuries from motorized and non-motorized recreationists using the same trails.

Effects of Alternative D

Under Alternative D, opportunities for wheeled motorized access would be less than under Alternative A, but greater than under Alternatives B and C (**Table 4-114**). Opportunities for non-motorized users would be greater than under Alternative A but less than under Alternatives B and C. Under Alternative D approximately 36 percent of all BLM roads in the Decision Area would be closed or decommissioned.

Under Alternative D, user conflicts would be less than under Alternative A, but more than under Alternatives B or C. Due to increased route closures and seasonal restrictions, some dispersed recreation opportunities would be created that allow motorized and non-motorized users to recreate separately compared to the current condition.

The extent of management activities and costs under Alternative D would be mixed. Alternative D would entail additional construction costs compared to the other alternatives due to several new roads that would be constructed to interconnect with existing routes. Increased education and compliance monitoring would result in increased management costs under Alternative D compared to Alternative A, but these costs would be lower than under Alternatives B and C. Signage costs would be less than under Alternative A but greater than under either Alternatives B or C.

Additional Effects at Decision Area and Planning Area Scales

Decreased opportunities for motorized recreation would help reduce the cumulative effects on natural resources, help provide non-motorized opportunities, and help reduce conflicts between motorized and non-motorized users. Under the action alternatives, motorized users would end up with fewer miles of dispersed roads or trails to recreate upon, and/or be displaced from some site-specific areas. As a result, motorized use would become more concentrated onto a smaller network of roads and trails. With some exceptions, given the combined level of motorized opportunities available across public lands managed by various agencies (USFS, BLM, MFWP, etc.), it should be many years before competition among motorized users for the same space becomes a social issue. Exceptions may include focus areas such as the Whitetail-Pipestone designated OHV trail system. Whitetail-Pipestone has gained rapidly in popularity (and public exposure) since its recent travel plan development in 2002; and receives use by local residents as well as regional and nationwide visitors. Given the increasing popularity of motorized use, focus areas such as Whitetail-Pipestone would likely become more crowded in the future regardless of future travel management direction.

At the Planning Area scale, there are other key variables affecting travel management. Private lands account for nearly 49 percent of lands in the Planning Area. There is a general trend for private landowners to restrict public access onto or across their lands. This trend may be offset somewhat by the acquisition of additional lands by BLM, access easements, and block hunting agreements. Human population in the Planning Area grew by 40 percent between 1970 and 2002. In some cases, this population influx has led to fragmentation of large tracts of private lands for residential development, further complicating public access issues. This trend will

likely continue. These same factors and influences would also affect travel management decisions made by other agencies located within the Planning Area, such as USFS, MFWP, and Bureau of Reclamation. Given that Butte Field Office lands occupy about 4.2 percent of all lands, and BLM roads make up about 4.8 percent of Planning Area total road mileage, the effects of BLM travel plan alternatives on travel management overall would be relatively minor at this scale.

TRANSPORTATION FACILITIES

Costs associated with travel management for all BLM lands in the Butte Field Office (**Table 4-115**) are based on historical cost figures for road and trail maintenance. Percentage of annual maintenance is also historical, with 20 percent of the total mileage of roads receiving annual maintenance. The remaining 80 percent of roads and trails would receive stabilization work and emergency repairs as needed.

Table 4-115 Field Office Wide Route/Trail Annual Maintenance Costs				
Classification/ Cost	Alt A	Alt B	Alt C	Alt D
Miles of Open/ Restricted Roads	629.2	416.9	372.4	478.6
Motorized Trails	75	75	75	75
Annual Road Maintenance	\$50,336	\$33,352	\$29,792	\$38,288
Annual Trail Maintenance	\$3,000	\$3,000	\$3,000	\$3,000
Periodic Road Stabilization	\$33,574	\$22,246	\$19,871	\$25,538
Periodic Trail Stabilization	\$1,200	\$1,200	\$1,200	\$1,200
Monitoring/ Compliance	\$31,460	\$20,845	\$18,535	\$23,930
Weed Control	\$9,438	\$6,254	\$5,586	\$7,179

Under Alternative A, the Butte Field Office transportation system would have 629.2 miles of open roads (including open with seasonal restrictions) and 75 miles of motorized trails (**Table 4-115**).

Estimated costs for annual maintenance, periodic stabilization, monitoring of compliance with travel plans, and weed control on roads would be about 30 percent more than any of the action alternatives.

Under Alternative B, the Butte Field Office transportation system would have 416.9 miles of open roads (including open with seasonal restrictions) and 75 miles of motorized trails (**Table 4-115**). Estimated costs for annual maintenance, periodic stabilization, monitoring of compliance with travel plans, and weed control on roads under Alternative B would be slightly higher than under Alternative C and less than under Alternatives A and D.

Under Alternative C the transportation system would have 372.4 miles of open roads (including open with restrictions) and 75 miles of motorized trails (**Table 4-115**). Estimated costs for annual maintenance, periodic stabilization, monitoring of compliance with travel plans, and weed control on roads under Alternative C would be less than under any other alternative.

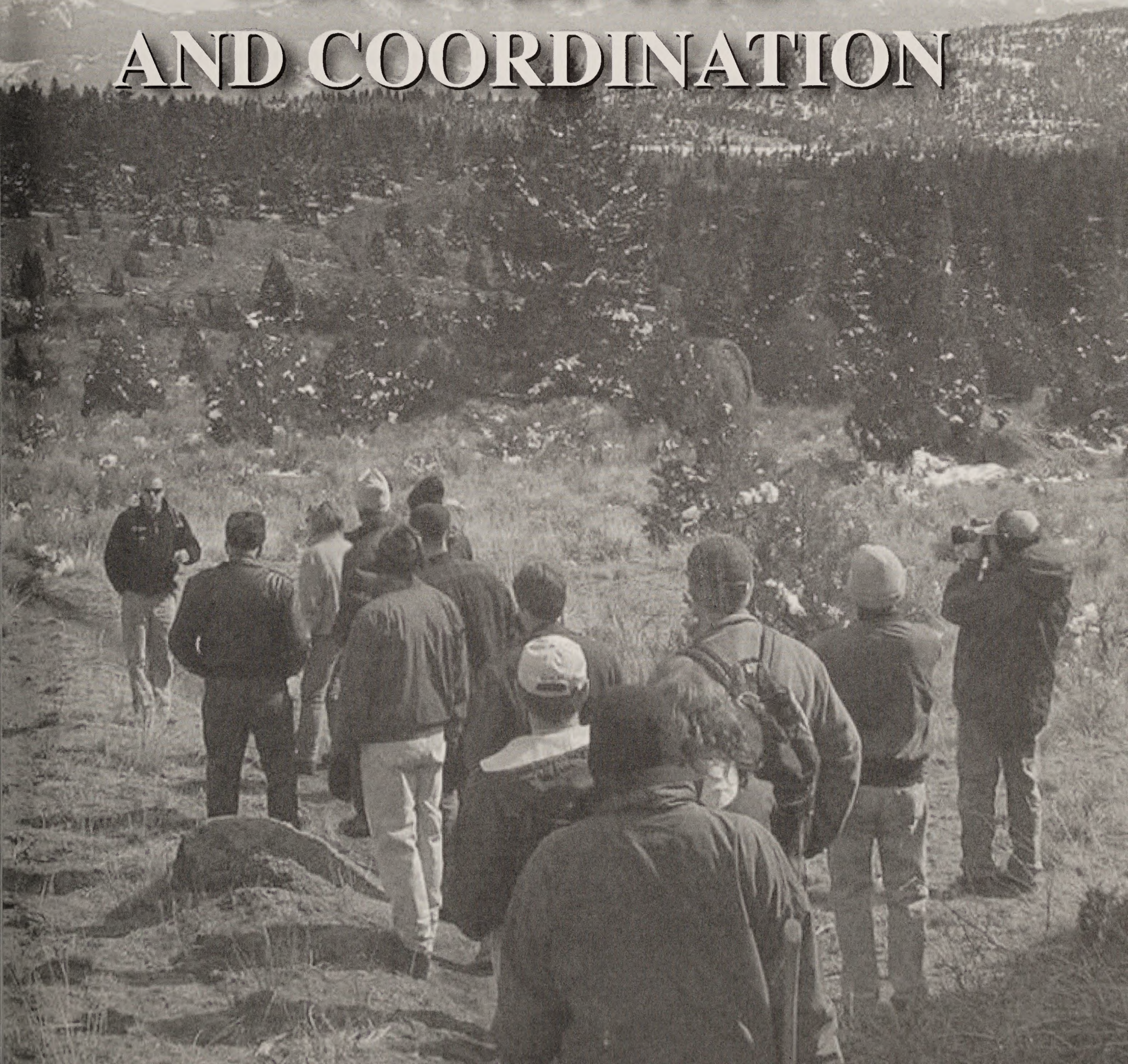
Under Alternative D, the Butte Field Office transportation system would have 478.6 miles of open roads (including open with restrictions) and 75 miles of motorized trails (**Table 4-115**). Estimated costs for annual maintenance, periodic stabilization, monitoring of compliance with travel plans, and weed control on roads under Alternative D would be greater than under Alternatives B and C, but less than under Alternative A.

CHAPTER 3 CONSULTATION AND COORDINATION

CHAPTER 5

CONSULTATION

AND COORDINATION



CHAPTER 5

CONSULTATION AND COORDINATION

INTRODUCTION

This chapter describes the public participation opportunities made available through the development of the Draft RMP/EIS. This chapter also describes consultation and collaboration efforts conducted by BLM with various entities. A distribution list identifies agencies, congressional staff, businesses and organizations that were sent a copy of the Draft RMP/EIS.

The Draft RMP/EIS was prepared by an interdisciplinary team of resource specialists from the Butte Field Office, Montana State Office, and Maxim Technologies (RMP contractor).

Members of the planning team have consulted formally and informally with various agencies, local government representatives, groups and individuals during the preparation of this document. Consultation, coordination, and public involvement occurred as a result of scoping, briefings, informal meetings, and individual contacts.

SCOPING AND PUBLIC INVOLVEMENT PRIOR TO THE DRAFT RMP/EIS

A number of opportunities were available to the public to educate themselves about the planning process and participate in development of the plan prior to release of the Draft RMP/EIS for public review and comment.

A press release with regional distribution was issued at each major stage of the planning process including scoping, travel management planning, and issuance of the Proposed Planning Scenario. In addition, three planning updates were mailed to the general mailing list to announce the start of the planning process, again to announce the start of the travel planning effort, and again to describe preliminary draft alternatives and request Draft RMP/EIS document preference.

The web site www.mt.blm.gov/bdo/rmp/index.htm provided information on the resource and travel planning processes.

The Western Montana Resource Advisory Council, a 15 member advisory group appointed by the Secretary of Interior, was briefed at a number of their meetings on the status of the Butte RMP/EIS and given the opportunity to ask questions and provide feedback. The council's role is to provide advice to BLM on a variety of issues associated with public land management.

TRAVEL MANAGEMENT PLANNING

Five public meetings were held over a two-week period during November and December 2004 on travel plan-

ning. Separate meetings were held specific to five Travel Planning Areas: Upper Big Hole, Boulder/Jefferson City, East Helena (North Hills), Helena (Scratchgravel Hills), and Lewis and Clark NW (Marysville). The overall goals of the meetings were to identify public travel planning issues and concerns for BLM lands, and to identify possible solutions to issues and concerns. Public attendance at these meetings is presented below:

- Upper Big Hole – 4 attendees;
- Boulder/Jefferson City – 7 attendees;
- East Helena (North Hills) – 24 attendees;
- Helena (Scratchgravel Hills) – 101 attendees; and
- Lewis and Clark NW (Marysville) – 16 attendees.

COLLABORATIVE EFFORTS

A variety of public involvement strategies have been implemented throughout this planning process to improve communication and develop understanding of the issues and the process in development of the RMP/EIS. In addition to the scoping efforts and public meetings described in Chapter 1, various potential cooperators including Tribes, the Governor's Office, state and federal agencies, and local governments within the Planning Area were solicited to become cooperators in summer 2002. No agencies or governments signed on as cooperators for the development of this draft plan.

TRAVEL MANAGEMENT WORKING GROUPS

In an effort to help BLM develop site-specific travel management alternatives agreeable to the public as well as the agency, community based collaborative working groups were initiated. Two working groups, representing a wide, "balanced" range of public land users, were recruited and managed under the direct supervision and guidance of the Lewis and Clark County Board of Commissioners. One of the groups was assigned to assist with travel planning for the Helena (Scratchgravel Hills) and East Helena (North Hills) TPAs, and the other for the Lewis and Clark County NW (Marysville) TPA. Membership criteria included: Montana residency, familiarity with the TPAs, and a willingness to work collaboratively with people of differing viewpoints. In order to provide for balanced representation, members were selected from three different interest categories (in accordance with the Western Montana Resource Advisory Council criteria), as described below.

Category 1:

Hold federal grazing permits or leases within the Travel Planning Area;

Represent interests associated with transportation or rights-of-way;

Represent developed outdoor recreation, OHV users, or commercial recreation activities;

Represent the commercial timber industry; or

Represent energy or mineral development.

Category 2:

Nationally or regionally recognized environmental organization;

Dispersed recreational activities;

Archaeological and historical interests; or

Nationally or regionally recognized wild horse and burro interest groups.

Category 3:

Hold state, county, or local elected office;

Are employed by a state agency responsible for the management of natural resources, land, and water;

Represent Indian tribes within or adjacent to the Travel Planning Area;

Are employed as academicians in natural resource management or the natural sciences; or

Represent the public-at-large.

The Working Groups consisted of eight or nine members, representing each of the three interest categories. These individuals included:

Helena-East Helena Working Group

- Cleve Johnson (Category 1)
- R. Allan Payne (Category 1)
- Randy Pearson (Category 1)
- Andy Baur (Category 2)
- Cedron Jones (Category 2)
- Connie Cole (Category 2)
- Rich Moy (Category 3)
- Bonnie Morgan (Category 3)
- Marilyn Pearson (Category 3)

Lewis and Clark County NW Working Group

- Mike Clark (Category 1)
- Eric LeLacheur (Category 1)
- Rudy Strobbe (Category 2)

- Ken Wallace (Category 2)
- Shaheen Siddiqui (Category 2)
- George Marble (Category 3)
- George Bower (Category 3)
- Michael McHugh (Category 3)

Each group held a series of five or six meetings during June and July 2005. The meetings were attended by at least one BLM representative available to answer questions, provide information and feedback from the BLM's interdisciplinary team, and provide written materials and maps as needed. Group recommendations for route-specific management were based on consensus. In the end, the working groups were able to arrive at complete consensus for the Marysville (subset of Lewis and Clark County NW TPA) and North Hills (subset of East Helena TPA) areas, but only partial consensus for the Scratchgravel Hills (subset of Helena TPA) area.

The Working Groups presented their findings to the Lewis and Clark County Commissioners at their regularly scheduled meeting in Helena on September 22, 2006. The Lewis and Clark Commissioners forwarded Working Group recommendations to the BLM soon afterward. BLM incorporated working group recommendations into Alternative B for each of these three Travel Planning Areas.

FORMAL CONSULTATION**FISH AND WILDLIFE SERVICE
CONSULTATION**

Federal agencies are required to comply with provisions of the Endangered Species Act of 1973, as amended. This includes a requirement to "consult" with the U.S. Fish and Wildlife Service on any action that may affect species listed as threatened and endangered or result in destruction or adverse modification of habitat designated as critical for listed species. In addition, federal agencies must "confer" with USFWS on any action that is likely to jeopardize the continued existence of any species proposed to be listed or any action that may result in the destruction or adverse modification of critical habitat proposed to be designated for listed species.

This RMP/EIS is considered to be a major project and this document describes potential impacts to threatened and endangered species as a result of management actions proposed in the RMP. Contacts were made with the USFWS early in the RMP process, and a representative of the USFWS was on the planning team during development of the plan to adequately address and discuss the effects of management actions on listed and proposed species and their critical habitats. The USFWS also provided guidance to the BLM regarding

compliance with Executive Order 13186 for the conservation of migratory birds.

Early drafts of alternative provisions were provided to USFWS staff for discussion and review. An initial list of federally listed threatened or endangered plant, animal, or fish species or habitats present in the Butte Field Office Planning Area was requested on March 23, 2006, with an update received March 29, 2006. Four federally listed threatened wildlife species and one threatened plant species potentially occur, or potential habitat is available in the Planning Area. These include: grizzly bear (*Ursus arctos horribilus*), gray wolf (*Canis lupis*), Canada lynx (*Lynx Canadensis*), bald eagle (*Haliaeetus leucocephalus*), and Ute ladies' tresses (*Spiranthes diluvialis*).

A draft biological assessment that evaluates the impacts of the preferred alternative on federal threatened and endangered species has been submitted concurrently with public release of this document to the USFWS. The Proposed RMP/Final EIS will include the final biological assessment and resulting USFWS biological opinion.

STATE HISTORIC PRESERVATION OFFICE CONSULTATION

The BLM cultural resource management program operates in accordance with 36 CFR Part 800 which provides specific procedures for consultation between the BLM and the State Historic Preservation Office. The SHPO was consulted during the development of the Draft RMP/EIS concerning cultural resources that may be affected by being included on the RMP mailing list throughout scoping and public involvement. The Proposed Planning Scenario and solicitation for feedback were also sent to SHPO in June 2005.

TRIBAL CONSULTATION

In accordance with the National Historic Preservation Act as well as in recognition of the government-to-government relationship between tribes and the federal government, letters were sent to the Blackfeet, Shoshone, Salish and Kootenai, and Shoshone-Bannock tribal governments and officials on August 13, 2002 to invite them to be cooperating agencies on the Butte RMP. The letters also requested their input on issues and concerns to be considered during the planning process and initiate efforts to identify areas of traditional cultural concern.

In December 2004 BLM invited the following tribes to an agency update briefing on the Butte RMP that was held in Helena on February 15, 2005: Tribal Council of the Confederated Tribes of the Flathead Reservation, Shoshone-Bannock Tribes Business Council, Shoshone Business Council, and the Blackfeet Tribal Business Council.

BLM solicited feedback when the Proposed Planning Scenario was sent to the following tribal governments in June 2005: Turtle Mountain Band of Chippewa Indians, Blackfeet Tribal Business Council, Chippewa Cree Business Committee, Tribal Council of the Confederated Salish-Kootenai Tribes of the Flathead Reservation, Crow Tribal Council, Fort Peck Tribal Executive Board, Northern Cheyenne Tribal Council, Shoshone-Bannock Tribes Business Council, and the Nez Perce Tribes.

Feedback was further solicited in additional mailings of the Proposed Planning Scenario in Spring 2006 to the Tribal Historic Preservation Offices of these tribes: Turtle Mountain Band of Chippewa Indians, Chippewa Cree Business Committee, Tribal Council of the Confederated Salish-Kootenai Tribes of the Flathead Reservation, Fort Belknap Community Council, Fort Peck Tribal Executive Board, Northern Cheyenne Tribal Council, Shoshone Business Council, Arapaho Business Council, Shoshone-Bannock Tribes Business Council, Nez Perce Tribal Executive Committee, and Blackfeet Tribal Business Council.

INFORMAL CONSULTATIONS

BLM has conducted less formal coordination and consultation with various entities throughout the development of the Draft RMP/EIS. As directed by the Watershed Protection and Flood Prevention Act and the Clean Water Act, BLM has included the U.S. Environmental Protection Agency, Montana Department of Environmental Quality, and Natural Resource Conservation Service in scoping activities, including the scoping of the Proposed Planning Scenario in June 2005.

Livestock grazing permittees and lessees have been included in public scoping efforts and mailings. Interested permittees were included in the scoping of the Proposed Planning Scenario in June 2005.

PLAN DISTRIBUTION

Since initial scoping, BLM has maintained a mailing list of individuals, special interest groups, and federal, state, tribal, and local government entities interested in development of the Butte RMP. In an effort to reduce printing costs, notices were mailed to everyone on the RMP mailing list in September 2006 to remove those no longer interested in receiving hard copies of the plan from the mailing list. People responding to this notice by November 15, 2006, were guaranteed a hard copy of the document.

Copies of the Draft RMP/EIS are also available for public review at the following locations:

BLM Butte Field Office

BLM Dillon Field Office

BLM Missoula Field Office

Helena National Forest Supervisor's Office
 Gallatin National Forest Supervisor's Office
 Beaverhead-Deerlodge National Forest Supervisor's Office
 Beaverhead-Deerlodge National Forest Butte Ranger District/S.O. Annex
 Beaverhead-Deerlodge National Forest Wise River Ranger District
 Butte Public Library
 Helena Public Library
 Bozeman Public Library
 Dillon Public Library
 Whitehall Public Library
 Anaconda Public Library
 Livingston Public Library
 Boulder Public Library

The Draft RMP/EIS is also available electronically at the Butte Field Office website at, www.blm.gov/mt/st/en/fo/butte_field_office.html.

Concurrent with the distribution of the Draft RMP/EIS, a Notice of Availability was published by EPA in the Federal Register which marks the beginning of the 90-day public comment period. BLM also published a Notice of Availability in the Federal Register announcing the availability of the Draft RMP/EIS for public comment.

Hard copies of the Draft RMP/EIS have been distributed to the following organizations, agencies, and individuals who requested them, or as required by regulation or policy.

Federal Government Agencies

Bureau of Reclamation
 Environmental Protection Agency – Region 8
 US Army – Montana National Guard
 US Fish & Wildlife Service – Helena
 US Fish & Wildlife Service – Billings
 Beaverhead-Deerlodge National Forest Butte Ranger District/S.O. Annex

 USDA Forest Service – Beaverhead-Deerlodge NF - Dillon
 USDA Forest Service – Beaverhead-Deerlodge NF - Whitehall
 USDA Forest Service – Beaverhead-Deerlodge NF – Wise River

USDA Forest Service – Gallatin NF
 USDA Forest Service – Helena NF – Helena
 USDA Forest Service – Helena NF – Townsend
 USDA – National Resources Conservation Service – Dillon
 USDA – National Resources Conservation Service – Townsend

State Government Agencies

Honorable Brian Schweitzer, Governor of Montana
 Montana Bureau of Mines and Geology
 Montana Department of Environmental Quality
 Montana Department of Natural Resources and Conservation
 Montana Fish, Wildlife & Parks - Bozeman
 Montana Fish, Wildlife & Parks – Butte
 Montana Fish, Wildlife & Parks – Helena
 Montana Fish, Wildlife & Parks – Townsend
 Montana Fish, Wildlife & Parks – Dillon
 Montana State Historic Preservation Office

Local Governments

Beaverhead County Commission
 Beaverhead County Weed Coordinator
 Broadwater County Commission
 Broadwater County Weed Coordinator
 City of Helena Parks and Recreation
 Deer Lodge County Commission
 Deer Lodge County Weed Coordinator
 Gallatin County Commission
 Gallatin County Weed Coordinator
 Jefferson County Commission
 Jefferson County Weed Coordinator
 Jefferson County Weed District
 Lewis and Clark County Commission
 Lewis and Clark County Planning Department
 Lewis and Clark County Weed Coordinator
 Park County Commission
 Park County Environmental Council
 Park County Planner
 Park County Weed Coordinator
 Silver Bow County Commission

Silver Bow County Weed Coordinator

Tribal Governments and Committees

Arapaho Business Council

Blackfeet Planning and Development

Blackfeet Tribal Council

Chippewa Cree Business Committee

Confederated Salish and Kootenai Tribes

Crow Tribal Council

Fort Belknap Community Council

Fort Peck Tribal Executive Board

Nez Perce Tribal Executive Committee

Nez Perce Tribes Cultural Resources Committee

Northern Cheyenne Tribal Council

Shoshone Business Council – Fort Washakie

Shoshone-Bannock Tribes Business Council – Fort Hall

Turtle Mountain Band of Chippewa Indians

Congressionals

U.S. Representative, Dennis Rehberg

U.S. Senator, John Tester

U.S. Senator, Max Baucus

Nongovernmental Organizations and Businesses

American Wildlands

Boone and Crockett Club – Townsend

Butte Skyline Sportsmen

Capital Trail Vehicle Association (CTVA)

Driftwood Ranch

East Pioneer Experimental Stewardship Program

Elkhorn Working Group

Gold Prospectors Association

Graymont Western US, Inc.

Helena Mineral Society

International Association of Fish and Wildlife Agencies

Jefferson River Watershed Council

Johns Ranch, Inc.

Lamarche Creek Ranch

Lewis and Clark Search and Rescue

Lorengo Logging

Mining City Trailriders

Montana Foundation for North American Wild Sheep

Montana Logging Association

Montana Mining Association – Helena Chapter

Montana Natural Heritage Program

Montana Snowmobile Association

Montana Stockgrowers Association

Montana Trail Vehicle Riders Association – Bozeman

Montana Trail Vehicle Riders Association – Great Falls

Montana Trout Unlimited

Montana Tunnels Mining, Inc.

Montana Wilderness Association – Bozeman

Montana Wilderness Association – Dillon

Montana Wilderness Association – Helena

Montana Wildlife Federation

Montana Wood Products Association

Northwestern Energy

Pacific Legal Foundation

PPL Montana, LLC (PPLM)

Public Lands Access Association, Inc.

Reinhardt Ranch

Renewable Technologies

Rocky Mountain Elk Foundation

Safari Club International – Southwest Montana Chapter

Safari Club International – Washington, DC Office

Silver City Lumber, Inc.

Sims Ranch

Skyline Sportsmen Association

Smurfit Stone Container Company

Snowmobile Alliance for Western States

Stanchfield Cattle Company

State Land Coalition

Stoel Rives, LLP

Sun Mountain Lumber

Sunny Vista Homeowners Association

Teddy Roosevelt Conservation Partnership

Three Horse Ranch

Tomahawk Ranch

Vigilante Electric Cooperative

Western Association of Fish & Wildlife Agencies

LIST OF PREPARERS

An interdisciplinary team of resource specialists from the BLM Butte Field Office, and the State of Montana BLM office prepared this RMP/EIS. Maxim Technologies, a subsidiary of Tetra Tech Inc. assisted the BLM

in the planning process and preparation of these documents (**Table 5-2**). Rick Hotaling, Field Manager of the Butte Field Office, provided guidance, oversight, and support in developing the Draft RMP/EIS and moving the planning process forward.

Table 5-1
List of Contributors

Name	Responsibility	Location	Years Experience	Education
Tim LaMarr	Project Manager	Butte Field Office	19	B.S. Fisheries Biology, Humboldt State University, 1987
Kelly Acree	Lands and Realty	Butte Field Office	23	Oregon State University, University of Oregon, 2000 Lands & Realty Academy, NTC Phoenix
Gary Beals	Lands and Realty	Butte Field Office	30½	B.S. Animal Science, MSU Bozeman 1971 B.S. Range Management, MSU Bozeman 1972 Lands and Minerals School, BLM
Jodi Belanger-Woods	Abandoned Mine Lands/ Hazardous Waste/Soil/ Water	Butte Field Office	12	B.S. Environmental Engineering, 1995 M.S. Civil Engineering, 2004 University of Montana - Montana Tech
John Bown	Oil and Gas	Montana State Office, Billings	27½	B.S. Geology, Millsaps College M.S. Geology and Geophysics, Uni- versity of Missouri - Rolla
Kirsten Boyle	Noxious Weeds	Butte Field Office	3	B.S., Land Resources and Environ- mental Science, Land Analysis and Management, MSU 2004
Mike Browne	Abandoned Mine Lands/ Hazardous Waste	Butte Field Office	27	Hazardous Waste Management Certi- fication, Wayne State University, 2004 M.S. Soil Science, Montana State University, 1987 B.S. Agronomy, Plant Production, Montana State University, 1977 B.S. Fish & Wildlife Management, Montana State University, 1974
Joan Gabelman	Minerals/Abandoned Mine Lands	Butte Field Office	19	B.S. Geology, California State Uni- versity, Hayward, 1985 M.S. Geology, New Mexico Institute of Mining and Technology, 1988
Lindsey Goetz	Forestry/Vegetation	Butte Field Office	6	B.S., Forestry, Northern Arizona Uni- versity, 2000
Carrie Kiely	Cultural Resources/ Paleontology	Butte Field Office	15	B.A. English Literature, Colorado State University, 1985 M.A. Anthropology, Colorado State University, 1993
Sarah LaMarr	Wildlife/Fisheries/ Vegetation	Butte Field Office	16	B.S. Fish and Wildlife Management Michigan State University, E. Lans- ing, MI 1991

Table 5-1 List of Contributors				
Name	Responsibility	Location	Years Experience	Education
Huey Long	Soil/Water	Butte Field Office	34	B.S. Agricultural Science, Soils Montana State University Bozeman, MT 1971
Ruth Miller	Project Manager	Montana State Office, Billings	14	B.S. Forestry Recreation Resources, 1991 Oregon State University Corvallis, OR
Brian Mueller	GIS	Butte Field Office	10	B.A. Anthropology, University of Minnesota, 1994 B.A. Geography, University of Utah, 1998 Masters GIS, University of Minnesota, 2004
Brad Rixford	Recreation/Special Area Designations/ Visual Resources	Butte Field Office	28	B.S. Recreation/Forestry, University VT, 1974
John Sandford	Noxious Weeds	Butte Field Office	26	B. S. Recreation Resource Manage- ment, University of Montana, 1980
Traci Scott	Secretary	Butte Field Office	9	High School Graduate, Business Computer Certification
Mike Small	Forestry	Butte Field Office	23	B.S. Forest Sciences, Humboldt State University
Katie Stevens	Document Review	Montana State Office, Billings	5	B.A. Environmental Studies, Montana State University Billings, 2002
Floyd Thompson	Grazing/Sensitive Plants	Butte Field Office	17	Range Management, Montana State University
John Thompson	Economics	Montana State Office, Billings	28	BS, Economics and Political Science, South Dakota State University MS, Agricultural Economics (Re- source Economics) Purdue University
John W. Thompson	Fire/Air	Butte Field Office	20	A.A.S. Civil Engineering Technology, Montana Tech College of Technology 1990 B.S. Forest Resource Management, University of Montana 1994
Joan Trent	Social Resources	Montana State Office, Billings	26	B.A. Psychology, Miami University (of Ohio) M.En. with a concentration in the social sciences Miami University
Charles Tuss	Fire/Air	Butte Field Office	16	B.S. Resource Conservation, Univer- sity of Montana
Dave Williams	Solid Minerals/ Aban- doned Mine Lands	Butte Field Office	30	B.S. Geology, Bates College, M.S. Igneous and Metamorphic Petrology, University of Montana
Pat Zurcher	Travel Management	Butte Field Office	3 (Travel Planning)	B.S. Political Science (International Relations), University of Oregon Master Arts in Teaching, Reed Col- lege, Oregon

Table 5-1
List of Contributors

Name	Responsibility	Location	Years Experience	Education
Daphne Digrindakis	Project Manager Travel Management	Contractor	20	BA, Geology, University of Montana, 1980
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Matt Dadswell	Social, Economics, Environmental Justice	Contractor	12	PhD Candidate, Geography, University of Washington, 1995-1997 MA, Geography, University of Cincinnati, 1990 BA, Economics and Geography, Portsmouth Polytechnic, 1988
Joe Elliott	Vegetation, Weeds, T&E Species	Contractor		PhD, Botany, University of Montana, 1969 BS, Biology and Chemistry, Wisconsin State University Eau Claire, 1965
Cameo Flood	Assistant Project Manager, Forestry, Fire Management, Visual Resource Management	Contractor	20	BS, Forestry, University of Montana, 1985
Fred Gifford	GIS	Contractor	20	BA, Geography, University of Texas-Austin, 1984
Terry Grotbo	Project Manager	Contractor	25	BS, Earth Science (Geology major, Soil minor), Montana State University, 1977
Miriam Hacker	Air Quality	Contractor	11	MS Civil and Environmental Engineering University of Wisconsin-Madison 1995 BA Mathematics Skidmore College 1991
Dave Highness	GIS	Contractor	12	MA, Geography University of Montana, 1998 BA, Anthropology University of Alaska, 1988
Allan Kirk	Geology, Minerals	Contractor	32	MS, Geology (Structural Geology & Economic Geology), State University of New York-Buffalo, 1972 BS, Geology (Igneous Petrology), University of New Hampshire, 1969
Richard Leferink	GIS	Contractor	11	BS, Economics, Montana State University, 1991
Mike Manka	Wild and Scenic Rivers	Contractor	12	BS, Biology, Ecology & Systematics, Cornell University 1992
Mary McCormick	Cultural Resources	Contractor	23	MA, History (Historic Preservation and Archival Management), Colorado State University, 1985 BA, History and Anthropology, University of Nebraska-Lincoln, 1978
Joy McLain	Lands and Realty, Grazing	Contractor	11	BS, Environmental Health, Boise State University, 1995

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Name	Responsibility	Location	Years Experience	Education
Angie Nelson	Special Designations	Contractor	10	BA Biology/English, Drake University, 1995
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Alice Stanley	Assistant Project Manager, Water, Hazardous Materials, Abandoned Mine Lands	Contractor	18	MS, Hydrogeology Montana State University, 1978 BS, Geology, University of Colorado, 1987
Judd Stark	Grazing	Contractor	6	BS, Land Rehabilitation (Soil Science), Montana State University-Bozeman, 1999
Ed Surbrugg	Soil	Contractor	20	PhD, Soil Science (Soil Physics), North Carolina State University, 1992 MS, Land Rehabilitation (Soils), Montana State University, 1982 BS, Range Ecology (Land Rehabilitation), Colorado State University, 1979
Bruce Suenram	Fire Management	Contractor	35	BA, Biology; California State University-Stanislaus; 1973
Walt Vering	Fisheries	Contractor	13	MS, Natural Resources (Wetlands), University of Wisconsin-Stevens Point, 1993 BA, Biology, Wartburg College, 1988
Heidi Turek	Lands and Realty	Contractor	10	BS, Geography/ Cartography, University of Wisconsin-Madison, 1987
Walt Weaver	Transportation	Contractor	40	BS, Civil Engineering, Iowa State University, 1961
Jill Wilkinson	GIS	Contractor	2	BA, Political Science, Montana State University, 2000 Certificate, ArcView-GIS, University of Montana, 2004

A black and white photograph of a pronghorn standing in a field of low-lying vegetation. The pronghorn is facing the camera, with its head slightly turned to the right. Its body is dark, and its legs are also dark. The background is filled with dense, low-lying plants and shrubs. The text "REFERENCES CITED" is overlaid in the upper center of the image in a bold, serif font.

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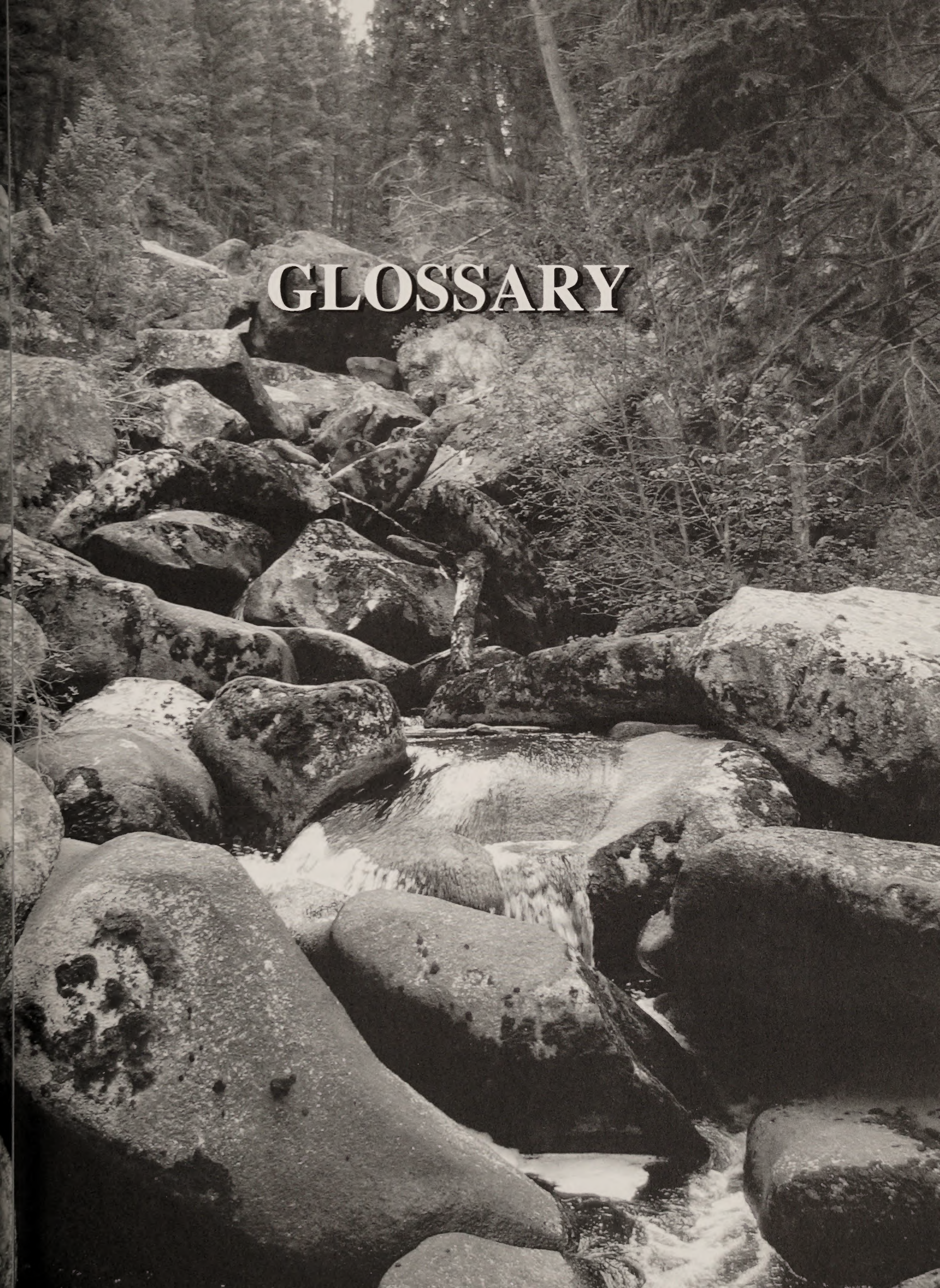
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A black and white photograph of a rocky stream with a small waterfall. The stream flows over large, dark, moss-covered boulders. The water is white and frothy as it falls. The background is a dense forest of tall trees, with sunlight filtering through the canopy. The word "GLOSSARY" is superimposed in a large, white, serif font across the upper middle of the image.

GLOSSARY

GLOSSARY

-A-

ABANDONED MINE LANDS: Inactive or abandoned mines located on or near public land where the owner or operator cannot be established, have no financial assets, are cannot assist with the reclamation of these mine sites.

ADVERSE OR NEGATIVE: An effect that is detrimental or causes harm to a specific resource or resource use. Could be used in short-term, long-term, or both short and long-term contexts.

ACCELERATED EROSION: Soil loss above natural levels resulting directly from human activities. Because of the slow rate of soil formation, accelerated erosion can lead to a permanent reduction in plant productivity.

ACTIVE PREFERENCE: That portion of the total grazing preference for which grazing use may be authorized.

ACTIVITY PLAN: Site-specific plan which precedes actual development. This is the most detailed level of BLM planning, and is also referred to as project level or implementation level planning.

ACTUAL USE: The amount of animal unit months consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by periodic field checks by the BLM.

ADMINISTRATIVE UNIT: Field Office, Resource Area, District or State.

AFFECTED ENVIRONMENT: Natural, physical and human-related environment that is sensitive to changes due to proposed actions.

AIR QUALITY: Refers to standards for various classes of land as designated by the Clean Air Act of 1978.

ALLOTMENT: An area of land where one or more livestock operators graze their livestock. Allotments generally consist of BLM lands but may also include other federally managed, state owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

ALLOTMENT CATEGORIZATION: Grazing allotments and rangeland areas used for livestock grazing are assigned to an allotment category during resource management planning. Allotment categorization is used to establish priorities for distributing available funds and personnel during plan implementation to achieve cost-effective improvement of rangeland resources. Categorization is also used to organize allotments into similar groups for purposes of developing multiple use prescriptions, analyzing site-specific and cumulative impacts, and determining trade-offs.

ALLOTMENT MANAGEMENT PLAN: A written program of livestock grazing management, including supportive measures if required, designed to attain specific management goals in a grazing allotment.

ALLOWABLE SALE QUANTITY: The maximum quantity of timber that may be sold from the area of suitable land covered by the resource management plan for a specified time period specified by the plan.

ALTERNATIVE: In an Environmental Impact Statement, one of a number of possible options for responding to the purpose and need for action.

ALLUVIUM: Any sediment deposited by flowing water, as in a river bed, floodplain, or delta.

AMENDMENT: The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or Management Framework Plans using the prescribed provisions for resource management planning appropriate to the proposed action or circumstances. Usually only one or two issues are considered that involve only a portion of the planning area.

ANALYSIS AREA: The geographic area defining the scope of analysis for a particular resource. This area may be larger than the project area when effects have the potential to extend beyond the boundaries of the proposed action.

ANALYSIS OF THE MANAGEMENT SITUATION: A comprehensive documentation of the present conditions of the resources, current management guidance, and opportunities for change.

ANIMAL UNIT MONTH (AUM): A standardized measurement of the amount of forage necessary for the sustenance of one cow unit or its equivalent for 1 month; approximately 800 pounds of forage.

APPEAL: Application for review by a higher court.

APPLICATION FOR PERMIT TO DRILL (APD): Before beginning construction or the drilling of a well, the lessee or operator must file an Application for Permit to Drill (APD) with the BLM Great Falls Oil and Gas Field Station. A copy of the application is posted in the Field Station and Butte Field Office, and if applicable, in the office of the Surface Management Agency (SMA) for a minimum of 30 days for review by the public. After 30 days, the application can be approved in accordance with (a) lease stipulations, (b) Onshore Oil and Gas Orders, and (c) Onshore Oil and Gas regulations (43 CFR Part 3160) if it is administratively and technically complete.

APPROPRIATION: Public lands covered by an entry, settlement, claim, location, withdrawal, or reservation

that sets the land apart for some particular use or disposal.

AQUATIC: Living or growing in or on the water.

AQUIFER: A water-bearing bed or layer of permeable rock, sand, or gravel capable of yielding large amounts of water.

ARCHAEOLOGICAL RESOURCE/REMAINS: A term with legal definition and application, meaning any material remains of human life or activities that are at least 100 years of age, and that are of archaeological interest.

AREA OF CRITICAL ENVIRONMENTAL CONCERN: Areas within the public lands where special management attention is required to: (1) protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or (2) protect life and safety from natural hazards.

ARID: A condition of a region where precipitation is insufficient to support any but drought-adapted vegetation.

ARMORING: Placement of protective material for the primary purpose of reducing sediment into streams or other water bodies.

ASPECT: (1) the visual first impression of vegetation at a particular time or seen from a specific point. (2) The predominant direction of the slope of the land.

ASSESSMENT: The act of evaluating and interpreting data and information for a defined purpose.

AUTHORIZED OFFICER: The Federal employee who has the delegated authority to make a specific decision.

AUTHORIZED USE: Uses of public land that may be authorized include agriculture development, residential use (under certain conditions), business, industrial, and commercial uses, advertising; research projects, State National Guard maneuvers, and motion picture filming. Recreational concessions are considered business uses and may be authorized by lease. Timber harvest, livestock grazing, mineral extraction and special recreation events, among other uses, are authorized under other regulations and not under Section 302 of the Federal Land Policy Management Act (FLPMA).

AVOIDANCE AREAS: Areas with sensitive resource values where rights-of-way would be strongly discouraged. Authorizations made in avoidance areas would have to be compatible with the purpose for which the area was designated and not be otherwise feasible on lands outside the avoidance area.

-B-

BACK COUNTRY BYWAYS: Vehicle routes that traverse scenic corridors utilizing secondary or back country road systems. National back country byways are designed

by the type of road and vehicle needed to travel the byway.

BANKFULL CHANNEL: The elevation on the stream-bank where flooding begins. Bankfull discharge normally re-occurs every 1½ years. The bankfull stage corresponds to the discharge at which channel maintenance is effective.

BASIN: A depressed area having no surface outlet (topographic basin); a physiographic feature or subsurface structure that is capable of collecting, storing, or discharging water by reason of its shape and the characteristics of its confining material (water); a depression in the earth's surface, the lowest part often filled by a lake or pond (lake basin); a part of a river or canal widened (drainage, river, stream basin).

BENEFICIAL OR POSITIVE: An effect promoting a favorable result for a specific resource or resource use. Could be used in short-term, long-term, or both short and long-term contexts.

BEST MANAGEMENT PRACTICES (BMPs): A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes. Best management practices are often developed in conjunction with land use plans, but they are not considered a land use plan decision unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory.

BIG GAME: Large species of wildlife that are hunted, such as elk, deer, bighorn sheep, and pronghorn antelope.

BIG GAME ANALYSIS UNIT: Logical locations across the landscape to conduct analysis of big game winter range. These areas were broken out based on a combination of Elk Management Units from Montana's Elk Management Plan (MFWP 2004) and watershed boundaries.

BIODIVERSITY: The diversity of living organisms considered at all levels of organization including genetics, species, and higher taxonomic levels, and the variety of habitats and ecosystems, as well as the processes occurring therein.

BIOLOGICAL ASSESSMENT: The gathering and evaluation of information on proposed endangered and threatened species and critical habitat and proposed critical habitat. Required when a management action potentially conflicts with endangered or threatened species, the biological assessment is the way federal agencies enter into formal consultation with the Fish and Wildlife Service and describe a proposed action and the consequences to the species the action would affect.

BIOLOGICAL WEED TREATMENT: These are treatments which involve living creatures, such as insects, sheep and goat grazing, plant pathogens, and biopesticides.

BIOMASS: Vegetative byproducts or materials leftover from stand treatments usually made up of all or portions of trees and woody shrubs, including limbs, tops, stumps and stems. This term can refer to such material that can be gathered and transported to cogeneration plants, and there utilized for production of electricity.

BOARD FEET: A unit of solid wood one foot square and one inch thick. (BF- board foot, MBF-thousand board feet, MMBF million board feet)

BROWSE: To browse (verb) is to graze a plant; also, browse (noun) is the tender shoots, twigs and leaves of trees and shrubs often used as food by livestock and wildlife.

BUFFER ZONE (STRIP): A protective area adjacent to an area of concern requiring special attention or protection. In contrast to riparian zones which are ecological units, buffer strips can be designed to meet varying management concerns.

BUNCHGRASS: Individual grasses that have the characteristic growth habit of forming a "bunch" as opposed to having stolens or rhizomes or single annual habit.

-C-

CANDIDATE SPECIES: Any species included in the Federal Register notice of review that are being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

CANOPY: Foliar layer(s) consisting of the crowns of trees or shrubs in a forest or woodland.

CARRYING CAPACITY: The maximum stocking rate possible without damaging vegetation or related resources.

CENOZOIC: The most recent era of geologic history (65 million years ago until the present) during which the world's modern landforms, animals, and plants came into being.

CHANNEL: An open conduit either naturally or artificially created which periodically or continuously contains moving water or forms a connecting link between two bodies of water.

CHEMICAL WEED TREATMENT: These are treatments using additives, such as applying herbicides or changing soil nutrient ratios.

CLASSIFICATION: The authority of the Secretary of the Interior to examine land to see whether it is proper for entry, selection, or location.

CLASSIFICATION OF LANDS: The process of determining whether lands are more valuable or suitable for transfer or use under particular or various public land laws than for retention in federal ownership for management purposes.

CLEAN AIR ACT: Federal legislation governing air pollution.

CLIMAX: The culminating stage in plant succession for a given site where vegetation has reached a highly stable condition.

CLIMAX VEGETATION: The ecological vegetation community that represents the culminating stage or highest development of natural vegetative succession. The climax community often can perpetuate itself indefinitely unless disturbed by outside forces.

CLOSE (SEGREGATE): To remove land from operation of some or all of the public land laws for a given period of time.

CLOSED: Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs.

CLOSED ROAD: Closed to motorized public access and subject to administrative or permitted uses based on case-specific exceptions (such as for mining claimants with existing claims accessed by existing routes). Routes identified as closed would have a route bed left intact in case they are needed for valid existing rights only, or in the extended future for administrative purposes. Closed routes would be open to non-motorized use.

CODE OF FEDERAL REGULATIONS (CFR): The official, legal tabulation or regulations directing federal government activities.

COLLABORATION: A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands.

COMMERCIAL FOREST LAND: Forest land which is producing, or has a site capable of producing, at least 20 cubic feet/acre/year of a commercial tree species.

COMMON VARIETY MINERALS: Stone, gravel, pumice, pumicite, and cinders that, though possibly having value for trade, manufacture, the sciences, or the mechanical or ornamental arts, do not have a distinct, special value for such use beyond normal uses. On the public lands such minerals are considered salable and are disposed of by sales or by special permits to local governments.

COMMUNITY: An assemblage of plant and animal populations in a common spatial arrangement.

COMPOSITION (OF FOREST VEGETATION): The proportion of each tree species in a stand, expressed as a percentage of the total number, basal area, or volume of all tree species in the stand.

CONDITION CLASS: Departure from the historic fire regime, as determined by the number of missed fire return intervals - with respect to the historic fire return interval and the current structure and composition of the system resulting from alternations to the disturbance

regime. Three classes categorize the current condition with respect to each of five historic Fire Regime Groups. The relative risk of fire-caused loss of key components defines the system increases for each higher number condition. Class 1 level means little or no risk.

CONFORMANCE: That a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

CONIFER: A tree or shrub of the order Coniferae with cones and needle-shaped or scale like leaves.

CONIFEROUS: Pertaining to conifers, which bear woody cones containing naked seeds.

CONNECTIVITY: The degree to which similar but separated vegetation components of a landscape are connected.

CONSERVATION AGREEMENT: A formal signed agreement between the U.S. Fish and Wildlife Service or National Marine Fisheries Service and other parties that implements specific actions, activities, or programs designed to eliminate or reduce threats or otherwise improve the status of a species. Conservation agreements can be developed at a State, regional, or national level and generally include multiple agencies at both the State and Federal level, as well as tribes. Depending on the types of commitments the BLM makes in a conservation agreement and the level of signatory authority, plan revisions or amendments may be required prior to signing the conservation agreement, or subsequently in order to implement the conservation agreement.

CONSERVATION STRATEGY: A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threats. Conservation strategies are generally developed for species of plants and animals that are designated as BLM Sensitive species or that have been determined by the Fish and Wildlife Service or National Marine Fisheries Service to be Federal candidates under the Endangered Species Act.

CONSISTENCY: The proposed land use plan does not conflict with officially approved plans, programs, and policies of tribes, other Federal agencies, and State, and local governments to the extent practical within Federal law, regulation, and policy.

CONTIGUOUS: lands or legal subdivisions having a common boundary; lands having only a common corner are not contiguous.

COOPERATING AGENCY: Assists the lead Federal agency in developing an Environmental Analysis or Environmental Impact Statement. The Council on Environmental Quality regulations implementing NEPA

defines a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA. Any tribe or Federal, State, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

CORRIDOR: A wide strip of land within which a proposed linear facility could be located.

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ): An Executive Office advisory council established by the National Environmental Policy Act of 1969 for review of federal program effects on the environment. They conduct environmental studies and advise the President on environmental matters.

COVER: Any form of environmental protection that helps an animal stay alive (mainly shelter from weather and concealment from predators).

COVER TYPE: The present vegetation composition of an area, described by the dominant plant species.

CRITICAL HABITAT: An area occupied by a threatened or endangered species "on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection".

CULTURAL RESOURCE/ CULTURAL PROPERTY: a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) or traditional cultural or religious importance to specified social and/or cultural groups. Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit.

CULTURAL RESOURCE INVENTORY CLASSES:

- Class I – Existing data inventory: a study of published and unpublished documents, records, files, registers, and other sources, resulting in analysis and synthesis of all reasonably available data. Class I inventories encompass prehistoric, historic, and ethnological/sociological elements, and are in large part chronicles of past land uses. They may have major relevance to current land use decisions.
- Class II – Sampling field inventory: a statistically based sample survey designed to help characterize the probable density, diversity, and distribution of archaeological properties in a large area by interpreting the results of surveying limited and discontinuous portions of the target area.
- Class III – Intensive field inventory: a continuous, intensive survey of an entire target area, aimed at

locating and recording all archaeological properties that have surface indications, by walking close-interval parallel transects (generally at 30 m intervals) until the area has been thoroughly examined.

CULTURAL WEED TREATMENT: These are treatments which involve human behavior, such as using quarantine, closure, or relocation of a particular activity to reduce weed spread, selective timing and choice of stock for grazing, containing livestock after they have grazed in a weed infested area, revegetation seed mix choices for rehabilitating new soil disturbances, land use choices, and public outreach methods.

CUMULATIVE IMPACT: The impact on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

-D-

"DE FACTO" WITHDRAWAL: An action that closes lands through a means other than formal withdrawal, e.g. application, classification, land use planning decision.

DECIDUOUS: Pertaining to plants that shed all their leaves every year in a certain season.

DECISION AREA: Within the Butte Field Office Planning Area, BLM administers about 302,000 acres of public land surface and 656,000 acres of federal mineral estate. All public land managed by the BLM within the Planning Area is referred to as the Decision Area.

DECOMMISSIONED ROAD: Route is closed and rehabilitated to eliminate resource impacts (for example, to eliminate erosion or to restore a riparian area if route is located within a riparian area) and is no longer useable for public or administrative uses.

DEEP SOILS: Soils that are 40 to 60 inches deep to bedrock.

DENNING HABITAT: Habitat used during parturition and rearing of young until they are mobile. The common component appears to be large amounts of coarse woody debris, either down logs or root wads. Coarse woody debris provides escape and thermal cover for kittens. Denning habitat may be found either in older mature forest of conifer or mixed conifer/deciduous types, or in regenerating stands (>20 years since disturbance). Denning habitat must be located within daily travel distance of foraging habitat (typical maximum daily distance for females is 3-6 miles).

DESIGNATED ROADS AND TRAILS: Specific roads and trails where some type of motorized vehicle use is allowed either seasonally or year-long.

DESIRED FUTURE CONDITION: Outcomes representing the long-term vision of BLM with regard to the resources managed in the Butte Field Office on BLM land.

DEVELOPED RECREATION: Recreation that requires facilities and might result in concentrated use of an area; for example, a campground.

DISPERSED RECREATION: Recreation activities of an unstructured type which are not confined to specific locations such as recreation sites. Example of these activities may be hunting, fishing, off-road vehicle use, hiking, and sightseeing.

DISTURBANCE: Events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include drought, floods, wind, fires, wildlife grazing, and insects and pathogens. Human-caused disturbances include actions such as timber harvest, fire, livestock grazing, road construction, and the introduction of exotic species.

DISTRIBUTION LINE: An electric power line operating at a voltage of less than 69 kilovolts.

DIVERSITY: The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

DRAINAGE: The removal of excess water from land by surface or subsurface flow.

DRILLING: The operation of boring a hole in the earth, usually for the purpose of finding and removing subsurface formation fluids such as oil and gas.

-E-

EASEMENT: A right afforded a person or agency to make limited use of another's real property for access or other purposes.

ECOLOGICAL FUNCTION: The process through which the constituent living and nonliving elements of ecosystems change and interact, including biogeochemical processes and succession.

ECONOMICS: The study of allocation of limited resources, goods, and services among competing uses.

ECOSYSTEM: A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

ELIGIBILITY (FOR WILD AND SCENIC RIVERS): A river is eligible for inclusion in the National Wild and Scenic River System if it is free flowing and has at least one river-related value that is considered outstandingly remarkable.

ELK MANAGEMENT UNIT: Designated by Montana Fish Wildlife and Parks, establishes statewide elk management population objectives and divides Montana's elk habitat into 35 management units, each

with its own elk management objectives and elk population targets.

EMERGENT VEGETATION: Aquatic plant species that are rooted in wetlands but extend above the water's surface.

ENCROACH: Plant succession in the absence of disturbance, in areas the plant type is not desired. Often associated with vegetative type conversion such as conifer colonization of grass or shrub meadows.

ENDANGERED SPECIES: Any plant or animal species which is in danger of extinction throughout all or a significant portion of its range.

ENTRY: An application to acquire title to public lands.

ENVIRONMENTAL ASSESSMENT: A concise public document that analyzes the environmental impacts of a proposed federal action and provides sufficient evidence to determine the level of significance of the impacts.

ENVIRONMENTAL IMPACT STATEMENT: A detailed written statement required by the National Environmental Policy Act when an agency proposes a major federal action significantly affecting the quality of the human environment.

ENVIRONMENTAL JUSTICE: Refers to the fair treatment and meaningful involvement of people of all races, cultures and incomes with respect to the development, implementation and enforcement of environmental laws, regulations, programs and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal state, local and tribal programs and policies.

Ephemeral area: Watershed land area that delivers surface water flow during spring runoff, rain and snow storms to intermittent and perennial streams.

EROSION: The wearing away of the land surface by running water, wind, ice, or other geological agents.

EXCEPTION (OIL AND GAS): A one-time exemption to a lease stipulation. Exceptions are determined on a case-by-case basis.

EXCHANGE: A trading of public lands (surface and/or subsurface estates) that usually do not have high public value, for lands in other ownerships that do have value for public use, management, and enjoyment. The exchange may be for the benefit of other federal agencies as well as for BLM.

EXCLUSION AREAS: Areas with sensitive resource values where rights-of-way would be prohibited.

EXPLORATION: The work of investigating a mineral deposit to determine by geological surveys, geophysical

surveys, geochemical surveys, boreholes, pits, and underground workings if it is feasible to mine.

EXTENSIVE RECREATION MANAGEMENT AREA: Areas where significant recreation opportunities and problems are limited and explicit recreation management is not required. Minimal management actions related to the Bureau's stewardship responsibilities are adequate in these areas.

-F-

FACULTATIVE (FAC): Plant species equally likely to occur in wetlands, riparian areas or non-wetlands (estimated probability 34%-66%).

FACULTATIVE WETLAND (FACW): Plant species that usually occur in wetlands or riparian areas (estimated probability 67%-99%), but occasionally found in non-wetlands or uplands.

FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976: Public Law 94-579. October 21, 1976, often referred to as the BLM's "Organic Act," which provides the majority of the BLM's legislated authority, direction, policy, and basic management guidance.

FEDERAL POWER PROJECT RESERVATION: A reservation of public lands for use in a project developed under the jurisdiction of the Federal Power Commission.

FEDERAL REGISTER: A daily publication that reports Presidential and Federal Agency documents.

FIRE CONDITION CLASS: Categorizes and describes vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Three classes serve as generalized wildfire risk rankings based on coarse-scale data. The risk components from unwanted wildland fire increases from lowest risk-Condition Class I, to highest-Condition Class 3.

FIRE FREQUENCY: How often fire burns a given area; often expressed in terms of fire return intervals. For example, a site might burn over every 5 to 15 years.

FIRE INTENSITY: Expression used to describe the power of wildland fires. More commonly described as the rate of energy released per unit length of the fire front.

FIRE MANAGEMENT PLAN: A strategic plan that defines a program to manage wildland and prescribed fires and documents the fire management program in the approved land use plan; the plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

FIRE MANAGEMENT ZONE: Administrative unit for wildland fire suppression, for the execution of all logistical, aviation, and support activities within this geographical area.

FIRE PREPAREDNESS: Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

FIRE REGIMES: periodicity and pattern of naturally occurring fires in a particular area or vegetative type, described in terms of frequency, biological severity, and aerial extent.

FIRE SEVERITY: A qualitative measure of the fire's immediate effects on the ecosystem. Relates to the extent of mortality and survival of plant and animal life—both above and below ground and to loss of organic matter.

FISHERY: Habitat that supports the propagation and maintenance of fish.

FLOOD PLAIN: The relatively flat area or lowlands adjoining a body of standing or flowing water which has been or might be covered by floodwater.

FLUVIAL: Pertaining to streams or produced by stream action.

FORAGE: All browse and herbaceous foods available to grazing animals, which may be grazed or harvested for feeding.

FORAGE RESERVE ALLOTMENT (GRAZING): A unit of public land that will not have term grazing permits issued. Such an allotment would only be grazed on a temporary nonrenewable basis. The use of these allotments would be to provide temporary grazing to rest other areas following wildfire, habitat treatments, or to allow for more rapid attainment of rangeland health. The allotment must be of sufficient size to be managed as a discrete unit. Resource Reserve Allotments should be distributed throughout the planning area.

FORB: An herbaceous plant that is not a grass, sedge, or rush.

FOREST HEALTH: The perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence, or unusual levels of insects and disease, and resilience to disturbance.

FOREST HEALTH TREATMENTS: Treatments that restore forest ecosystems or stands to a condition that sustains their complexity, function and/or productivity while providing for human needs.

FOREST LAND: Land that is now, or has the potential of being, at least 10 percent stocked by forest trees (based on crown closure) or 16.7 percent stocked (based on tree stocking).

FORMATION: A body of rock identified by lithic characteristics and stratigraphic position; it is prevailingly, but not necessarily tabular, and is mappable at the earth's surface or traceable in the subsurface.

Fossil: Mineralized or petrified form from a past geologic age, especially from previously living things.

FRAGMENTATION: The splitting or isolating of patches of similar habitat. Habitat can be fragmented by natural events or development activities.

FREE-FLOWING RIVER: Existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway.

FUEL LOADING: The weight of fuels in a given area, usually expressed in tons per acre, pounds per acre, or kilograms per square meter.

FUEL MANAGEMENT: Manipulation or reduction of fuels to meet forest protection and management objectives while preserving and enhancing environmental quality.

FUEL TREATMENT: The rearrangement or disposal of fuels to reduce the fire hazard.

FUEL TYPE: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

-G-

GAME SPECIES: Any species of wildlife or fish for which seasons and bag limits have been prescribed, and which are normally harvested by hunters, trappers, and fisherman under State or federal laws, codes, and regulations.

GENERAL ORDERS OF WITHDRAWALS: Executive Orders No. 6910 of November 26, 1934, and No. 6964 of February 5, 1935, which withdrew for classification all vacant public lands in the 11 western states and certain other public land states.

GEOGRAPHIC INFORMATION SYSTEM (GIS): A system of computer hardware, software, data, people and applications that capture, store, edit, analyze and graphically display a potentially wide array of geospatial information.

GEOPHYSICAL EXPLORATION: The use of geophysical instruments and methods to determine subsurface conditions by analyzing such properties as specific gravity, electrical conductivity, or magnetic susceptibility.

GOAL: A broad statement of a desired outcome. Goals are usually not quantifiable and may not have established time frames for achievement.

GRAZING SYSTEM: The manipulation of livestock grazing to accomplish a desired result.

GROUNDWATER: Water contained in pore spaces of consolidated and unconsolidated surface material.

GUIDELINES: Actions or management practices that may be used to achieve desired outcomes, sometimes

expressed as best management practices. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory.

-H-

HABITAT: A specific set of physical conditions that surround a species, group of species, or a large community. In wildlife management, the major constituents of habitat are considered to be food, water, cover, and living space. The complete suite of biotic and abiotic components of the environment where an animal lives.

HABITAT CONNECTIVITY: Vegetative cover in sufficient quantity and arrangement to allow for the movement of wildlife.

HABITAT DIVERSITY: The variation in types, sizes, and shapes of landscape elements or vegetation types.

HABITAT TYPE: A site classification of all land areas potentially capable of producing similar plant communities at the climax phase of succession.

HAZARDOUS FUEL: Excessive live or dead wildland fuel accumulations that increase the potential for uncharacteristically intense wildland fire and decrease the capability to protect life, property, and natural resources.

HEALTHY FOREST INITIATIVE OF 2002: Presidential direction to the Departments of Agriculture and the Interior to improve regulatory processes and management efficiency in reducing the threat of destructive wildfires while upholding environmental standards and encouraging early public input during review and planning processes. The initiative is based on sound science and helps care for forests and rangelands, reduce the risk of catastrophic fire to communities, help save the lives of firefighters and citizens, and protect threatened and endangered species.

HEAVY METAL: Any of the metals that react readily with dithizone, including zinc, copper, cobalt, lead, bismuth, gold, cadmium, iron, manganese, nickel, tantalum, tellurium, platinum, and silver.

HERBACEOUS: Pertaining to or characteristic of an herb (fleshy-stem plant) as distinguished from the woody tissue of shrubs and trees.

HIGH OR MAJOR: An effect is severe; there would be a highly noticeable, long-term or permanent measurable change.

HISTORIC: Period wherein nonnative cultural activities took place, based primarily upon European roots, having no origin in the traditional Native American culture(s).

HISTORIC PROPERTY OR HISTORIC RESOURCE: "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register. The term includes, for purposes of

these regulations, artifacts, records, and remains that are related to and located within such properties. The term 'eligible for inclusion in the National Register' includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria" {quoted from 36 CFR 900.2(e)}.

HOME RANGE: The area in which an animal travels in the scope of natural activities.

HORIZON (SOIL): A layer of soil or soil material roughly parallel to the land surface and differing from adjoining genetically related layers in physical, chemical, and biological properties or characteristics, such as color, structure, and texture.

HUMMOCK: A low, rounded hill, knoll, hillock; a tract of wooded land higher than a nearby swamp or marsh.

HYDROLOGIC CONDITION: The current state of the processes controlling the yield, timing, and quality of water in a watershed. Each physical and biologic process that regulates or influences stream flow and groundwater character has a range of variability associated with the rate or magnitude of energy and mass exchange. At any point in time, each of these processes can be defined by their current rate or magnitude relative to the range of variability associated with each process. Integration of all processes at one time represents hydrologic condition.

HYDROLOGIC UNIT CODE (HUC): A coding system developed by the U.S. Geological Survey to map geographic boundaries of watersheds by size.

HYDROPHYTIC: Water-loving; ability to grow in water or saturated soils.

-I-

IGNEOUS ROCK: Rock, such as granite and basalt, which has solidified from a molten or partially molten state.

IMPACT: A modification of the existing environment caused by an action (such as construction or operation of facilities).

IMPACTS (OR EFFECTS): Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

IMPLEMENTATION DECISIONS: Decisions that take action to implement land use plan decisions. They are generally appealable to Interior Board of Land Appeals.

IMPLEMENTATION PLAN: A site-specific plan written to implement decisions made in a land use plan. An implementation plan usually selects and applies best

management practices to meet land use plan objectives. Implementation plans include both activity plans and project plans.

INDIAN TRIBE: Any Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status.

INDICATOR (SPECIES): A species of animal or plant whose presence is a fairly certain indication of a particular set of environmental conditions. Indicator species serve to show the effects of development actions on the environment.

INDIRECT EFFECTS: Secondary effects that occur in locations other than the initial action or later in time.

INFILTRATION: The downward entry of water into the soil or other material.

INITIAL (FIRE) ATTACK: An aggressive fire suppression action consistent with firefighter and public safety and values to be protected.

INTEGRATED WEED MANAGEMENT (IWM): This is a decision support system involving deliberate selection, integration, and implementation of effective weed management tactics. It utilizes cost/benefit analysis and takes into consideration public interests and social, economical, and ecological impacts in the decision making process.

INTERDISCIPLINARY TEAM: A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions. The number and disciplines of the members preparing the plan vary with circumstances. A member may represent one or more discipline or Bureau program interest.

INTERIM MANAGEMENT POLICY: Policy that guides management of the BLM's Wilderness Study Areas. The policy balances the various uses of Wilderness Study Areas with the requirement to protect the lands wilderness values.

INTERIOR BOARD OF LAND APPEALS: The Department of the Interior, Office of Hearings and Appeals board that acts for the Secretary of the Interior in responding to appeals of decisions on the use and disposition of public lands and resources. Because the Interior Board of Land Appeals acts for and on behalf of the Secretary of the Interior, its decisions usually represent the Department's final decision but are subject to the courts.

INTERMITTENT STREAM: A stream which occasionally is dry or reduced to pool stage. Often the water drainage connection from ephemeral areas to perennial streams.

INVASIVE PLANTS: Plants which are invasive species.

INVASIVE SPECIES: Organisms that have been introduced into an environment where they did not evolve. Executive Order 13112 focuses on organism whose presence is likely to cause economic harm, environmental harm, or harms to human health.

INVERSION: The state of the atmosphere in which a layer of cool air is trapped near the earth's surface by an overlying layer of warm air so that the lower layer cannot rise. Serious air pollution problems may result from air pollutants being emitted into the limited mixing depth below the inversion.

IRREVERSIBLE COMMITMENT OF RESOURCES: Result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame.

IRRETRIEVABLE COMMITMENT OF RESOURCES: Result from actions in which resources are considered permanently lost.

-J-

JURISDICTION: The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority, but not necessarily ownership.

-K-

-L-

LAND CLASSIFICATION: A process for determining the suitability of public lands for certain types of disposal or lease under the public land laws or for retention under multiple use management.

LAND USE ALLOCATION: The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

LAND USE PLAN: A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land-use-plan-level decisions developed through the planning process, regardless of the scale at which the decisions were developed.

LEASABLE MINERALS: Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium, and sodium minerals, and oil, gas, and geothermal.

LEASE: (1) A legal document that conveys to an operator the right to drill for oil and gas; (2) the tract of land, on which a lease has been obtained, where producing wells and production equipment are located.

LEASE (OCCUPANCY): A usually long-term authorization to possess and use public lands for a fixed period of time (43 CFR 2910)

LEASE STIPULATION (OIL AND GAS): Conditions of lease issuance that provide protection for other resource

values or land uses by establishing authority for substantial delay or site changes or the denial of operations within the terms of the lease contract. The authorized officer has the authority to relocate, control timing, and impose other mitigation measures under Section 6 of the Standard Lease Form. Lease stipulations clarify the Bureau's intent to protect known resources or resource values.

LESSEE: A person or entity holding record title in a lease issued by the United States (see 43 CFR 3160.0-5).

LESSEE (GRAZING): Holder of a valid lease that authorizes grazing use of the public lands outside the grazing district.

LEK: An assembly area where birds, especially sage grouse, carry on display and courtship behavior.

LIMITED AREAS OR TRAILS: Designated areas or trails where the use of off-road vehicles is subject to restrictions, such as limiting the number or types of vehicles allowed, dates and times of use (seasonal restrictions), limiting use to existing roads and trails, or limiting use to designated roads and trails. Under the designated roads and trails designation, use would be allowed only on roads and trails that are signed for use. Combinations of restrictions are possible, such as limiting use to certain types of vehicles during certain times of the year.

LINKAGE: Route that permits movement of individual plants (by dispersal) and animals from a habitat type to another similar habitat type.

LITTER: The uppermost layer of organic debris on the soil surface, essentially the freshly fallen or slightly decomposed vegetal material.

LOAMY: Intermediate in texture and properties between fine- and course-textured soils.

LOCATABLE MINERALS: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

LODE MINING: Mining of a mineral deposit in solid rock.

LONG TERM: Effects lasting more than 10 years.

LOW OR MINOR: An effect is slight but detectable; there would be a small change.

LYNX HABITAT: Lynx occur in mesic coniferous forest that have cold, snowy winters and provide a prey base of snowshoe hare. In the Rocky Mountains primary vegetation that contributes to lynx habitat is lodgepole pine, subalpine fir, and Englemann spruce. Secondary vegetation that, when interspersed within subalpine forests, may also contribute to lynx habitat, includes cool, moist Douglas-fir, grand fir, western larch, and

aspen forest. Dry forest types (ponderosa pine, climax lodgepole pine) do not provide lynx habitat. Primary elevations for lynx habitat are between 1500-2000 m. (4,920 – 6,560 ft.) elevation zones in the northern Rockies.

-M-

MANAGEMENT DECISION: A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

MANAGEMENT FRAMEWORK PLAN: Planning decision document prepared before the effective date of the regulations implementing the land use planning provisions of the FLPMA, which establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, and objectives to be achieved for each class of land use or protection.

MANAGEMENT OPPORTUNITIES: A component of the analysis of the management situation; actions or management directions that could be taken to resolve issues or management concerns.

MEDIUM OR MODERATE: An effect is readily apparent; there would be a measurable change that could result in a small but permanent change.

MID-TERM: Effects lasting 5 to 10 years.

MILL: A plant in which ore is treated for the recovery of valuable minerals or valuable minerals are concentrated into a smaller bulk for shipping to a smelter or other reduction works.

MINE: An opening or excavation in the earth for extracting minerals.

MINERAL: Any solid or fluid inorganic substance that can be extracted from the earth for profit.

MINERAL ENTRY: The filing of a claim on public land to obtain the right to any minerals it may contain.

MINERAL ESTATE: The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

MINERAL MATERIALS: Materials such as common varieties of sand, stone, gravel, pumice, pumicite, and clay, that are not obtainable under the mining or leasing laws but that can be acquired under the Mineral Materials Act of 1947, as amended.

MINERAL WITHDRAWAL: A formal order that withholds federal lands and minerals from entry under the Mining Law of 1872 and closes the area to mineral location (staking mining claims) and development.

MINIMIZE: To reduce the adverse impact of an operation to the lowest practical level.

MINING CLAIM: A parcel of land that a miner takes and holds for mining purposes, having acquired the

right of possession by complying with the Mining Law and local laws and rules. A single mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

MINING DISTRICT: An area, usually designated by name, with described or understood boundaries, where minerals are found and mined under rules prescribed by the miners, consistent with the Mining Law of 1872.

MITIGATION MEASURES: Methods or procedures that reduce or lessen the impacts of an action.

MONITORING PLAN: The process of tracking the implementation of land use plan decisions and collecting and assessing data/information necessary to evaluate the effectiveness of land use planning decisions.

MODIFICATION: A change in a Plan of Operations that requires some level of review by BLM because it exceeds what was described in the approved Plan of Operations.

MODIFICATION (OIL AND GAS): A change to the provision of a lease stipulation either temporarily or for the term of the lease.

MONITORING PLAN: the process of tracking the implementation of land use plan decisions.

MULTIPLE USE: The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the lands for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some lands for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long term needs of future generations for renewable and nonrenewable resources, including but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the lands and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or greatest unit output.

-N-

NATIONAL AMBIENT AIR QUALITY STANDARDS: The allowable concentrations of air pollutants in the ambient (public outdoor) air. National ambient air quality standards are based on the air quality criteria and divided into primary standards (allowing an adequate margin of safety to protect the public health) and secondary standards (allowing an adequate margin of safety to protect the public welfare). Welfare is defined

as including (but not limited to) effects on soils, water, crops, vegetation, human-made materials, animals, wildlife, weather, visibility, climate, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1969: An Act that encourages productive and enjoyable harmony between man and his environment and promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding or the ecological systems and natural resources important to the Nation, and establishes the Council on Environmental Quality.

NATIONAL REGISTER OF HISTORIC PLACES: A register of districts, sites, buildings, structures, and objects, significant in American history, architecture, archaeology and culture, established by the "Historic Preservation Act" of 1966 and maintained by the Secretary of the Interior.

NATIONAL WILD AND SCENIC RIVERS SYSTEM: A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past, (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads, and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted.

NEGLIGIBLE: An effect at the lower level of detection; there would be no measurable change. Effects may not be readily noticeable.

NEUTRAL: An effect that is neither beneficial nor adverse to a specific resource or resource use.

NO SURFACE OCCUPANCY: A fluid minerals leasing constraint that prohibits occupancy or disturbance on all or part of the lease surface to protect special values or uses. Lessees may exploit the fluid mineral resources under the leases restricted by this constraint through use of directional drilling from sites outside the area.

NOXIOUS WEEDS: A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States.

NUTRIENT CYCLING: The circulation of chemical elements such as nitrogen, oxygen, carbon, and phosphorus in specific pathways from the abiotic (not involving or produced by organisms) portions of the environment into organic substances in plants and animals and then back into abiotic forms.

-O-

OBJECTIVE: A description of a desired condition for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

OBLIGATE: Essential, necessary, unable to exist in any other state, mode, or relationship.

OBLIGATE WETLAND (OBL): Plant species that occur almost always (estimated probability >99%) under natural conditions in wetlands or riparian zones.

OFF-HIGHWAY VEHICLE (OHV): Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) Any nonamphibious registered motorboat; (2) Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) Any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) Vehicles in official use; and (5) Any combat or combat support vehicle when used in times of national defense emergencies.

OLD FOREST STRUCTURE: Physical forest or woodland characteristics that contribute to the structure, composition or function of forested stands for a particular forest type. These characteristics include large and old tree components, accumulations of dead wood components such as standing snags and/or downed logs, occurrence of climax plant species or seral trees with a common decadent attributes such as broken or deformed tops and rotten boles, wide variation in tree age classes and stocking levels, and multiple canopy layers.

OLD-GROWTH: Forested stands in late successional stages of development meeting the main characteristics or old forest structures that are described by the forest type for the East-side Montana Zone in Old-Growth Forest Types of the Northern Region (Green, 1992¹)

Open: Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs.

OPEN ROAD: Open year-round to public and administrative uses.

OPEN ROAD WITH RESTRICTIONS: Open to public and administrative uses with seasonal and/or vehicle type limitations.

OPENING ORDER: Returning land to the operation of some or all of the public land laws. It is normally done at the same time as revocation.....opens lands to the

operation or partial operation of the public land laws. An opening order may be a part of the revocation order and need not be a separate document.

OPERATOR: Any person who has taken formal responsibility for the operations conducted on the leased lands.

ORE: A mineral deposit of high enough quality to be mined at a profit.

OUTSTANDINGLY REMARKABLE (RIVER) VALUES: Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act are "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values. . . ." Other similar values which may be considered include botanical, hydrological, paleontological, or scientific. Professional judgment is used to determine whether values exist to an outstandingly remarkable degree.

OVERSTORY: The layer of foliage in a forest canopy, often the uppermost layer(s) consisting of the crowns of trees or shrubs.

-P-

PALEONTOLOGICAL RESOURCES (FOSSILS): The physical remains of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are important for understanding past environments, environmental change, and the evolution of life.

PALEONTOLOGY: A science dealing with the life forms of past geological periods as known from fossil remains.

PARENT MATERIAL (SOIL): The unconsolidated more or less chemically weathered mineral or organic matter from which the upper level of the soil profile has developed.

PATENT: The instrument by which the Federal Government conveys title to the public lands.

PERENNIAL STREAM: A natural course that confines and conducts water that flows continuously during all seasons of the year.

PERMIT: A short-term (generally under 3 years), revocable authorization to use public lands for specific purposes. BLM issues permits under 43 CFR 2910.

PERMITTED USE: The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease. Expressed in AUMs.

PERMITTEE: Holder of a valid permit that authorizes certain uses of the public lands (e.g., for grazing).

PERMITTEE (GRAZING): Holder of a valid permit that authorizes grazing use of the public lands within the grazing district.

PETROGLYPH: A figure, design, or indentation carved, abraded, or pecked into a rock.

PHYSICAL WEED TREATMENT: These are treatments which use manual labor, mechanical equipment, or fire, such as hand-pulling, mowing or tilling, and prescribed burning.

PICTOGRAPH: A figure or design painted onto a rock.

PLACER: An alluvial deposit of sand and gravel containing valuable minerals such as gold.

PLACER MINING: A method of mining in which the overburden is removed to expose gold-bearing gravel deposits beneath. The gravel is then sluiced to separate the gold.

PLAN: A document that contains a set of comprehensive, long range decisions concerning the use and management of Bureau administered resources in a specific geographic area.

PLANNED SALE QUANTITY (PSQ): The allowable forest harvest level that can be maintained without decline over the long term, if the schedule of harvests and regeneration are followed. PSQ is an estimate of potential production rather than a specific level of forest product volume that would be offered every decade.

PLANNING AREA: A geographical area for which land use and resource management plans are developed and maintained. The Butte Field Office Planning Area is the boundary of the Butte Field Office and includes all of Lewis and Clark, Jefferson, Broadwater, Deer Lodge, Silver Bow, Gallatin, and Park Counties; and the northern portion of Beaverhead County.

PLANNING CRITERIA: The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision making, analysis, and data collection during planning. Planning criteria streamline and simplify the resource management planning actions.

PLANNING DECISION (LAND USE PLAN DECISION): establishes desired outcomes and actions needed to achieve them. Decisions are reached using the BLM planning process. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to Interior Board of Land Appeals.

POPULATION: Within a species, a distinct group of individuals that tend to mate only with members of the group. Because of generations of inbreeding, members of a population tend to have similar genetic characteristics.

POTENTIAL NATURAL VEGETATION: The vegetation that would become established if all successional sequences were completed without interferences by man under the present environmental conditions.

POWER SITE CLASSIFICATION: A classification made by the Federal Power Commission that is a segregation against the operation of the public land laws for lands that are needed or have potential for power projects and associated transmission lines. Lands classified to benefit transmission lines are open to the operation of the public land laws subject to their use for transmission lines.

POWER SITE RESERVE: A reservation of public lands that have potential value for power development.

PRECAMBRIAN: Pertaining to the earliest era of geological history, extending from 4.5 billion to 540 million years ago and encompassing 7/8 of the earth's history. Just before the end of the Precambrian, complex multicellular organisms, including animals, evolved.

PRECIOUS METAL: A general term for gold, silver, or any of the minerals of the platinum group.

PRE-COMMERCIAL THINNING: A thinning that does not yield trees of commercial value, usually designed to reduce stocking in order to concentrate growth on the more desirable trees or to meet desired vegetation and/or fuel loading conditions.

PREHISTORIC: Refers to the period wherein Native American cultural activities took place which were not yet influenced by contact with historic nonnative culture(s).

PRESCRIBED FIRE: The introduction of fire to an area under regulated conditions for specific management purposes.

PRESCRIPTION LIVESTOCK GRAZING (GRAZING): Grazing use authorized on land designated or not designated for livestock grazing designed to accomplish a specific purpose. For example, authorizing sheep and goats to graze a piece of land as a biological control agent to treat noxious weeds. Prescription grazing would normally be authorized on a temporary nonrenewable basis.

PREVENTION OF SIGNIFICANT DETERIORATION: A regulatory program based not on the absolute levels of pollution allowable in the atmosphere but on the amount by which a legally defined baseline condition will be allowed to deteriorate in a given area. Under this program, geographic areas are divided into three classes, each allowing different increases in nitrogen dioxide, particulate matter, and sulfur dioxide concentrations.

PREY BASE: Populations and types of prey species available to predators.

PRIMITIVE AND UNCONFINED RECREATION: Non-motorized, non-mechanized and undeveloped types of recreational activities.

PRIORITY HABITATS: Priority habitats would include habitat for all special status species as well as riparian areas, dry savannah forest, special habitats including caves, cliffs, snags, and down woody material, sagebrush, bitterbrush communities and mountain mahogany communities.

PRIORITY SPECIES: Priority species are those wildlife, fish or plant species that the BLM has determined to be unique or significant based on at least one of the following factors: density, diversity, population size, public interest, remnant character, or age.

PRIVATE EXCHANGE: A land exchange between the federal Government and any landowner other than a state.

PROJECT PLAN: A type of implementation plan. A project plan typically addresses individual projects or several related projects. Examples of project plans include prescribed burn plans, trail plans, and recreation site plans.

PROJECT AREA (MINERALS): The area of land upon which an operator conducts mining operations, including the area needed for building or maintaining of roads, transmission lines, pipelines, or other means of access.

PROJECT AREA (VEGETATION): An area of land within some type of management activity would occur and encompasses a region defined by logical boundaries such as: watersheds, ridges, highways, or ownership blocks of BLM lands. The project area can be both the analysis area and a starting point to determine where treatments or activities should occur, and includes the area needed for supporting structures and activities such as roads, transmission lines, or pipelines.

PROPER FUNCTIONING CONDITION (PFC): Ecosystems are in PFC when they function within their historic range of variability.

PROPOSED ACTION: A project or set of activities that a federal agency intends to implement, as defined in NEPA regulations.

PROPOSED PLANNING SCENARIO: Using comments received during the initial scoping period, the BLM interdisciplinary team developed the "Proposed Planning Scenario", to describe possible management prescriptions and goals for individual programs.

PROTEST: Application for review by a higher administrative level.

PUBLIC INVOLVEMENT: Any process designed to broaden the information base upon which agency decisions are made by informing the public about BLM activities, plans, and decisions to encourage public understanding about the participation in the planning processes which lead to final decision-making.

PUBLIC LAND: Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM, except lands located on the Outer Continental Shelf, and land held for the benefit of Indians, Aleuts, and Eskimos.

PUBLIC LAND LAWS: A body of laws that regulates the administration of the public lands and the resources thereon.

PUBLIC LAND ORDER (PLO): Creating, continuing, modifying, or revoking a withdrawal or reservation that has been issued by the Secretary of the Interior pursuant to his delegations of authority.

PUBLIC PURPOSE: A use in which the public has an interest, affecting its safety, health, morale, and welfare, but not including use for habitation, cultivation, trade, or manufacturing.

PUBLIC VALUE: An asset held by, service performed for, or benefit accruing to the people at large.

-Q-

QUARRY: An open or surface working, usually for the extraction of stone, slate, limestone, etc.

QUARRY SITE: Place where minerals occur which were a source of raw material for prehistoric/historic industries.

-R-

RANGELAND: Land used for grazing by livestock and big game animals on which vegetation is dominated by grasses, grass-like plants, forbs, or shrubs.

RAPTOR: Bird of prey with sharp talons and strongly curved beaks such as hawks, owls, vultures, and eagles.

REACH: A segment of stream.

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO: The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

RECLAMATION: The process of converting disturbed land to its former use or other productive uses.

RECLAMATION PROJECT: A water development and irrigation project of the Bureau of Reclamation.

RECLAMATION WITHDRAWALS:

- First Form: A reclamation withdrawal of public lands that are or may be needed for the building and maintaining a reclamation project.
- Second Form: A reclamation withdrawal of public lands susceptible to irrigation from a reclamation project.

- The distinction between the first and second forms of withdrawals has been eliminated, and all such withdrawals are called reclamation withdrawals.

RECORD OF DECISION: A document signed by a responsible official recording a decision that was preceded by the preparing of an environmental impact statement.

RECREATION AND PUBLIC PURPOSES (R&PP) ACT, THE ACT OF JUNE 14, 1926, AS AMENDED (43 U.S.C. 869, 869-4): A federal statute that allows the disposal of public lands to any state, local, federal, or political instrumentality or nonprofit organization for any recreation or public purpose, at the discretion of the authorized officer.

RECREATION OPPORTUNITY SPECTRUM (ROS): A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into six classes-primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural and urban.

RELICT: A remnant or fragment of the vegetation of an area that remains from a former period when the vegetation was more widely distributed.

RELINQUISHED ALLOTMENT (GRAZING): An allotment where an existing permittee or lessee gives up his or her permit or lease causing the allotment to become unleased.

RESEARCH NATURAL AREA: An area that illustrates or typifies for research or educational purposes, the important forest and range types in each field office, as well as other plant communities that have special or unique characteristics of scientific interest and importance.

RESERVATION: A "setting aside", or dedication of lands for the federal government for a specific public purpose. "Reserved" land is not necessarily withdrawn. A permanent withdrawal dedicated to a specific public purpose

RESERVES (MINERAL): Known mineral deposits that are recoverable under present conditions but are as yet undeveloped.

RESERVOIR (OIL AND GAS): A naturally occurring, underground container of oil and gas, usually formed by deformation of strata and changes in porosity.

RESOURCE ADVISORY COUNCIL: A council established by the Secretary of the Interior to provide advice or recommendations to BLM management.

RESOURCE MANAGEMENT PLAN: A land use plan as prescribed by the Federal Land Policy and Management Act which establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives and actions to be achieved.

RESOURCE RESERVE ALLOTMENT: A unit of public land that will not have term grazing permits issued. Such an allotment would only be grazed on a temporary nonrenewable basis. The use of these allotments would be to provide temporary grazing to rest other areas following wildfire, habitat treatments, or to allow for more rapid attainment of rangeland health. The allotment must be of sufficient size to be managed as a discrete unit. Resource Reserve Allotments should be distributed throughout the planning area.

REVISION: The process of completely rewriting the land use plan due to changes in the planning area affecting major portions of the plan or the entire plan.

REVOCATION: The action that cancels a withdrawal but does not necessarily "open" the lands to application or entry.

RIGHT-OF-WAY: A permit or an easement which authorizes the use of public lands for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, reservoirs, etc.; also, the lands covered by such an easement or permit.

RIGHT-OF-WAY CORRIDOR: A parcel of land that has been identified by law, Secretarial order, through a land use plan or by other management decision as being the preferred location for existing and future right-of-way grants and suitable to accommodate one type of right-of-way or one or more rights-of-way which are similar, identical or compatible.

RIPARIAN AREA: A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral areas or washes that lack vegetation and dependent on free water in the soil.

RIVER DESIGNATION: The process whereby rivers are added to the National Wild and Scenic Rivers System by an act of Congress or by administrative action of the Secretary of the Interior with regard to state-designated rivers under Section 2(a)(ii) of the Wild and Scenic Rivers Act.

ROAD DENSITY: Number of miles of open road per square mile.

ROADLESS: Refers to the absence of roads which have been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road.

ROCK ART: Petroglyphs or pictographs.

RUNOFF: The water that flows on the land surface from an area in response to rainfall or snowmelt.

-S-

SALABLE MINERALS: Common variety minerals on the public lands, such as sand and gravel, which are used mainly for construction and are disposed of by sales or special permits to local governments.

SALMONID: Any fish of the Salmonidae family, including salmon and trout.

SCALE: Refers to the geographic area and data resolution under examination in an assessment or planning effort.

SCENIC QUALITY: The degree of harmony, contrast and variety within a landscape.

SCENIC RIVER: A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

SCOPING: The process of identifying the range of issues, management concerns, preliminary alternatives, and other components of an environmental impact statement or land-use planning document. It involves both internal and public viewpoints.

SEASONAL RESTRICTION: A fluid minerals leasing constraint that prohibits surface use during specified time periods to protect identified resource values. The constraint does not apply to the operation and maintenance of production facilities unless analysis demonstrates that such constraints are needed and that less stringent, project-specific constraints would be insufficient.

SECTION 7 CONSULTATION: The requirement of Section 7 of the Endangered Species Act that all federal agencies consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service if a proposed action might affect a federally listed species or its critical habitat.

SECTION 106 COMPLIANCE: The requirement of Section 106 of the National Historic Preservation Act that any project funded, licensed, permitted, or assisted by the Federal Government be reviewed for impacts to significant historic properties and that the State Historic Preservation Officer and the Advisory Council on Historic Preservation be allowed to comment on a project.

SECURITY HABITAT: refers to the protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with hunting or other human activities.

SEDIMENT: Soil, rock particles and organic or other debris carried from one place to another by wind, water or gravity.

SEDIMENTARY ROCK: Rock resulting from consolidation of loose sediment that has accumulated in layers.

SEDIMENTATION: The process or action of depositing sediment.

SEGREGATION: Any action such as a withdrawal or allowed application (exchange) that suspends the operation of the general public land laws; removing lands from the operation of part or all the public land mineral laws.

SENSITIVE SPECIES: Species designated by the State Director, usually in cooperation with the State agency responsible for managing the species and State Natural heritage programs, as sensitive. They are those species that: (1) could become endangered in or extirpated from a State, or within a significant portion of its distribution; (2) are under status review by the FWS and/or NMFS; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listed, proposed, candidate, or State listed status may become necessary; (5) typically have small and widely dispersed populations; (6) inhabit ecological refugia or other specialized or unique habitats; or (7) are State listed but which may be better conserved through application of BLM sensitive species status..

SERAL: A temporal and intermediate condition pertaining to the successional stages of biotic communities.

SHAFT: A vertical or inclined opening to an underground mine.

SHALLOW SOILS: Soils that are less than 20 inches to bedrock.

SHORT TERM: Effects lasting less than 5 years.

SHRUB: A low, woody plant, usually with several stems, that may provide food and/or cover for animals.

SIGNIFICANT: An effect that is analyzed in the context of the proposed action to determine the degree or magnitude of importance of the effect, either beneficial or adverse. The degree of significance can be related to other actions with individually insignificant but cumulatively significant impacts.

SLASH: Forest residues such as branches, bark, tops, cull logs, broken or uprooted trees, and/or stumps that can be left on the ground or in piles after logging, vegetative or fuels treatments, or land use activities such as road construction.

SLOPE: The degree of deviation of a surface from the horizontal.

SOIL COMPACTION: A layer of dense soil caused by repeated impacts on or disturbances of the soil surface. Compaction becomes a problem when it begins to limit plant growth, water infiltration, or nutrient cycling processes.

SOIL PRODUCTIVITY: The capacity of a soil to produce a plant or sequence of plants under a system of management.

SOIL TEXTURE: The relative proportions of the three size groups of soil grains (sand, silt, and clay) in a mass of soil.

SOLITUDE: (1) the state of being alone or remote from others; isolation; (2) a lonely or secluded place.

SOURCE WATER PROTECTION PLAN: A management plan, usually developed by local communities, that addresses public water system concerns based on information contained within Source Water Delineation and Assessment Reports.

SPECIAL RECREATION MANAGEMENT AREA: A public lands unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities.

SPECIAL STATUS SPECIES: Includes proposed species, listed species, and candidate species under the ESA; State-listed species; and BLM State Director-designated sensitive species.

SPECIES: A unit of classification of plants and animals consisting of the largest and most inclusive array of sexually reproducing and cross-fertilizing individuals, which share a common gene pool.

SPECIES DIVERSITY: The number, different kinds of, and relative abundances of species present in a given area.

STAND: A community of trees or other vegetation uniform in composition, constitution, spatial arrangement, or condition to be distinguishable from adjacent communities.

STAND COMPOSITION: The proportion of each tree species in a stand expressed as a percentage of all trees, basal area or volume.

STANDARD: A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards). To be expressed as a desired outcome or goal.

STATE EXCHANGE: A land exchange between the federal government and a state.

STIPULATIONS: Requirements that are part of the terms of a mineral lease. Some stipulations are standard on all Federal leases. Other stipulations may be applied to the lease at the discretion of the surface management agency to protect valuable surface resources and uses.

STRATEGIC PLAN: A plan that establishes the overall direction for the BLM. This plan is guided by the requirements of the Government Performance and Results Act of 1993, covers a 5-year period, and is updated

every 3 years. It is consistent with FLPMA and other laws affecting the public lands.

STREAM REACH: A specified length of a stream or channel.

STRUCTURE (STREAM CHANNEL): Any object, usually large, in a stream channel that controls water movement.

STRUCTURE (OF FOREST VEGETATION): The horizontal and vertical distribution of plants in a stand, including height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, snags and coarse woody debris.

SUBSTRATE: The mineral or organic material that forms the bed of a stream; the base upon which an organism lives; the surface on which a plant or animal grows or is attached.

SUCCESSION: The replacement in time of one plant community with another. The prior plant community (or successional stage) creates conditions that are favorable for the establishment of the next stage.

SUITABILITY (FOR WILD AND SCENIC RIVERS): Evaluation of eligible rivers for inclusion into the national Wild and Scenic River System by Determining the best use of the river corridor and the best method to protect the outstandingly remarkable values within the river corridor.

SUSTAINABILITY: The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

SUSTAINED YIELD: Maintenance of an annual or regular periodic output of a renewable resource from public land consistent with the principles of multiple use.

-T-

TAILINGS: The waste matter from ore after the extraction of economically recoverable metals and minerals.

TAKE: As defined by the Endangered Species Act, "to harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect, or attempt to engage in any such conduct."

TERMS AND CONDITIONS: Measures contained in livestock grazing permits and leases, which are determined by the authorized officer to be appropriate to achieve management and resource condition objectives for the public lands and other lands administered by the BLM, and to ensure conformance with Fundamentals of rangeland health and Standards and guidelines for grazing administration.

TERRESTRIAL SPECIES: Ground-dwelling plants and animals.

THERMAL COVER: Vegetation or topography that prevents radiational heat loss, reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

THREATENED SPECIES: Any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range; listings are published in the Federal Register.

TOOLS: Something that helps to accomplish the stated goal or action for a resource/resource use or program. Tools include: timing, duration of grazing, forage utilization, grazing rotation, deferment of grazing, stubble height, bank alteration, and structural features.

TOTAL MAXIMUM DAILY LOAD: An estimate of the total quantity of pollutants (from all sources: point, nonpoint, and natural) that may be allowed into waters without exceeding applicable water quality criteria.

TRADITIONAL LIFEWAY VALUES: Values that are important for maintaining a group's traditional system of religious belief, cultural practice, or social interaction. A group's shared traditional lifeway values are abstract, nonmaterial, ascribed ideas that cannot be discovered except through discussions with members of the group. These values may or may not be closely associated with definite locations. Traditional lifeway values sometimes imbue cultural resources with significance. They can be identified through consultation and considered through public participation during planning and environmental review. The BLM does not manage people's values, beliefs, or social systems.

TRAVEL MANAGEMENT AREAS: Polygons or delineated areas where a rational approach has been taken to classify areas open, closed, or limited, and have identified and/or designated network of roads, trails, ways, and other routes that provide for public access and travel across the planning area. All designed travel routes within travel management areas should have a clearly identified need and purpose as well as clearly defined activity types, modes of travel, and seasons or timeframes for allowable access or other limitations.

TREATMENT AREA: The specific area of land where the actual management activity, such as timber harvest, prescribed burning, construction, or other activity would occur. One or more treatment areas can be included in a project area which usually includes adjacent and/or surrounding areas that are not treated, and multiple activities could occur within a single treatment area, concurrently or over time.

-U-

UNAUTHORIZED USE: Any occupancy or use of the public lands or the resources of the United States without authorization.

UNAVOIDABLE ADVERSE EFFECTS: Those that remain following the implementation of mitigation measures, and include effects for which there are no mitigation measures.

UNDERSTORY: Vegetation (e.g., trees or shrubs) growing under the canopy formed by taller trees.

UNGULATES: Hoofed animals, including ruminants but also horses, tapirs, elephants, rhinoceroses, and swine.

UNLEASED ALLOTMENTS (GRAZING): Areas of land designated and managed for livestock grazing which are currently not leased or permitted by a qualified applicant

UNRESERVED PUBLIC LANDS: Public lands not covered by a reservation or a withdrawal except by the federal orders of withdrawal.

UPLANDS: Lands at higher elevations than alluvial plains or low stream terraces; all lands outside the riparian-wetland and aquatic zones.

USE AUTHORIZATION: Approval of a proposed use for land or resources on the prescribed form or document designated for such use; a document showing permission to use land or the resources thereon; a formalized grant pursuant to a request to use land or resources.

USER DAY: Any calendar day, or portion thereof, for each individual accompanied or serviced by an operator or permittee on the public lands or related waters; synonymous with passenger day or participant day.

UTILIZATION (RANGELAND): The proportion of the current year's forage production that is consumed or destroyed by grazing animals. Utilization is usually expressed as a percentage.

-V-

VACANT AVAILABLE LANDS (GRAZING): Areas of land designated for livestock grazing which are not segregated into allotments. These lands may be formed into allotments if a qualified applicant applies for a lease or permit.

VACANT PUBLIC LANDS: Public lands that are unappropriated and unreserved and not within a withdrawal; lands that are not reserved except by the general orders of withdrawal.

VALID EXISTING RIGHTS: Locatable mineral development rights that existed when the Federal Land Policy and Management Act was enacted on October 21, 1976. Some areas are segregated from entry and location under the Mining Law to protect certain values or allow certain uses. Mining claims that existed as of the effective date of the segregation may still be valid if they can meet the test of discovery of a valuable mineral required under the Mining Law. Determining the validity of mining claims located in segregated lands requires BLM to conduct a validity examination and is called a "valid existing rights" determination.

VEGETATION COMMUNITY: An assemblage of plant populations in a common spatial arrangement.

VEGETATION MANIPULATION: Alteration of vegetation by using fire, plowing, cutting, powered mechanical, or other means.

VEGETATION TYPE: A plant community with distinguishable characteristics described by the dominant vegetation present.

VERY DEEP SOILS: Soils that are greater than 60 inches deep to bedrock.

VERY SHALLOW SOILS: Soils that are less than 10 inches to bedrock.

VIALE: Capable of sustaining a healthy, productive, and reproducing population over a long period of time.

VISUAL RESOURCE MANAGEMENT CLASSES: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective which prescribes the amount of change allowed in the characteristic landscape.

-W-

WAIVER (OIL AND GAS): A permanent exemption to a lease stipulation.

WASTE ROCK: Barren rock at a mine or material that is too low in grade to be of economic value.

WATER QUALITY: The chemical, physical, and biological characteristics of water with respect to its suitability for a particular use.

WATER QUALITY RESTORATION PLANS: A comprehensive plan developed in conjunction with Montana Department of Environmental Quality, local watershed groups, and numerous agencies and entities to address and establish water quality goals, Total Maximum Daily Loads, restoration strategies, and monitoring.

WATER TABLE: The surface in a groundwater body where the water pressure is atmospheric. It is the level at which water stands in a well that penetrates the water body just far enough to hold standing water.

WATERSHED: A geomorphic area of land and water within the confines of a drainage divide. The total area above a given point on a stream that contributes flow at that point.

WATERSHED APPROACH: A framework to guide watershed management that: (1) uses watershed assessments to determine existing and reference conditions; (2) incorporates assessment results into resource management planning; and (3) fosters collaboration with all landowners in the watershed. The framework considers both ground and surface water flow within a hydrologically defined geographical area.

WATERSHED ASSESSMENT: An analysis and interpretation of the physical and landscape characteristics of a watershed using scientific principles to describe watershed conditions as they affect water quality and aquatic resources.

WEED MANAGEMENT AREA: These are distinguishable zones based on similar geography, weed problems,

climate, or human-use patterns with agreements between landowners to cooperatively manage noxious weeds.

WETLAND VEGETATION: The outer extent of the obligate and facultative wetland species that grows on land that is inundated or saturated by surface water or groundwater.

WETLANDS: Areas that are inundated or saturated by surface or ground water often and long enough to support and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions.

WILD RIVER: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

WILD, SCENIC OR RECREATIONAL RIVER: The three classes of what is traditionally referred to as a "Wild and Scenic River." Designated river segments are classified as wild, scenic and/or recreational, but the segments cannot overlap.

WILD AND SCENIC STUDY RIVER: Rivers identified in Section 5 of the Wild and Scenic Rivers Act for study as potential additions to the National Wild and Scenic Rivers System. The rivers shall be studied under the provisions of Section 4 of the Wild and Scenic Rivers Act.

WILDCAT, OR EXPLORATION, WELL: A well drilled in the area where there is no oil or gas production.

WILDERNESS: A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

WILDERNESS CHARACTERISTICS: Key characteristics of a wilderness listed in section 2(c) of the "Wilderness Act" of 1964 and used by BLM in its wilderness inventory. These characteristics include size, naturalness, outstanding opportunities for solitude, outstanding opportunities for primitive and unconfined type of recreation, and special features.

WILDERNESS STUDY AREA: A designation made through the land use planning process of a roadless area

found to have wilderness characteristics as described in Section 2 (c) of the Wilderness Act of 1964

WILDFIRE: An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

WILDLAND FIRE: Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

WILDLAND FIRE SITUATION ANALYSIS: A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

WILDLAND URBAN INTERFACE (WUI): The line, area, or zone, where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel.

WILDLIFE CORRIDOR: Landscape elements that connect similar patches of habitat through an area with different characteristics. Wildlife corridors are also

segments of land which create a link between critical habitats. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest. These linkage zones are where species migrate and intermingle ensuring genetic interchange and consequently long-term survival.

WINTER RANGE: Range that is grazed during winter.

WITHDRAWAL: Removal or withholding of public lands by statute or secretarial order, from the operation of some or all of the public land laws.

WITHDRAWAL MODIFICATION: To make a change to an existing, indefinite withdrawal.

WITHDRAWAL REVOCATION: The cancellation of a withdrawal

WOODLAND: A forest community occupied primarily by noncommercial species such as juniper, mountain mahogany, or quaking aspen groves; all western juniper or limber pine are classified as woodlands, since juniper and limber pine are classified as noncommercial species.

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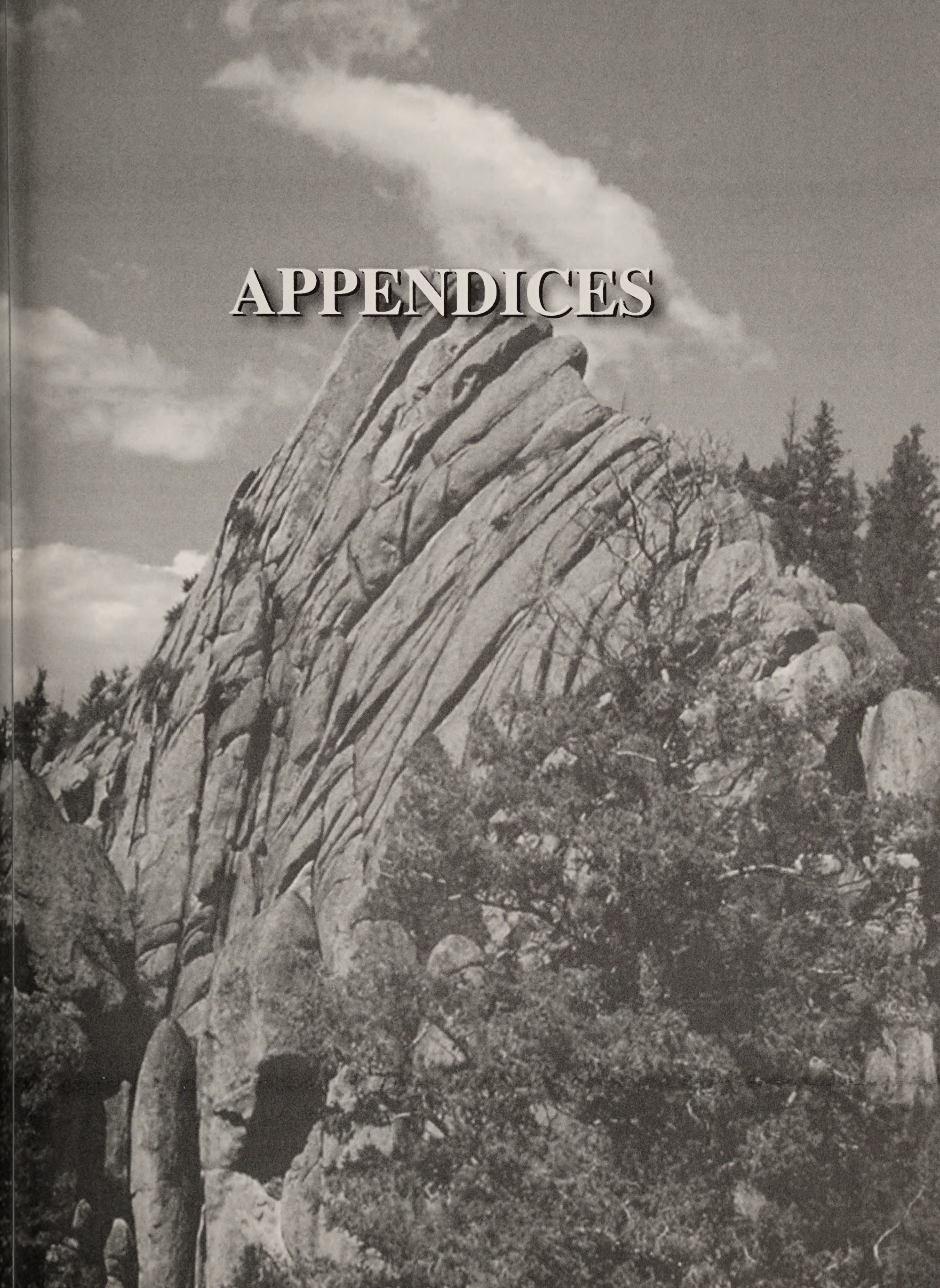


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APPENDICES



APPENDIX A – TRAVEL MANAGEMENT

TRAVEL MANAGEMENT DECISION MAKING CRITERIA AND ROUTE EVALUATION PROCESS USED BY BLM INTERDISCIPLINARY TEAM

(Refer to attached Written Criteria, Evaluation Worksheets, and Final Evaluation Table for the Helena Travel Planning Area)

The Butte Field Office Interdisciplinary Team developed an organized, systematic process to conduct route by route analysis for each of the 9 identified travel planning areas. Utilizing this process, each route was evaluated to determine its future management status as either Open, Open/With Restrictions, Closed, or Decommissioned.

Evaluations were conducted by analyzing three identified key Resource categories (Wildlife/Habitat, Aquatics/Fisheries, and Soils), and then comparing the *level of impacts* to those resources to the *level of importance* for Human Use. Six key Human Uses categories were identified. They are: Public Use (recreation, hunting, woodcutting, etc.), Wild-land Prescribed Fire, Forest Management, Mineral/Energy Development, and Range Management. Although the process provided separate analysis for Resource impacts, but combined the Human Use analysis, each was considered equally important and “weighted” the same during comparative analysis.

In addition to its route by route analysis, the Interdisciplinary Team reviewed and consulted the public scoping comments (issues/concerns, potential solutions) generated during a series of public travel planning meetings. The public comments provided useful information for site specific route evaluation as well as help set overall context for each travel planning area.

In order to provide a repeatable, systematic approach, Interdisciplinary Team members developed written criteria, with a range of numerical values (e.g., 0, 3, 6, 9), for use with each Resource and Human Use Worksheet. For Resource impact analysis, a numerical value of 0 indicates “No Impact”, while a numerical value of 9 indicates a “High level of Impact”. For Human Use analysis, a numerical value of 0 indicates “No Importance” to human use, while a numerical value of 9 indicates a “High Level of Importance” to human use.

As each Resource or Human Use specialist completed their route evaluation, the numerical values were entered on the respective Evaluation Worksheets and tabulated, and a final “rating” of Low, Medium, or High was assigned to each route. The Low, Medium, and High ratings were derived by tabulating the maximum numerical value achieved during the analysis, and then dividing the total into thirds to arrive at the Low Medium, and High rating.

For an example, refer to the written Wildlife/Habitat Criteria and Evaluation Worksheet for the Helena Travel Planning Area. In this case, 7 Wildlife/Habitat criteria were identified for the Helena TPA, each with a range of numerical values. The total *possible* maximum numerical value for these 7 criteria is 52; however, assume the highest numerical value actually achieved was 36. To determine the rating for Low, Medium, or High, divide 36 into thirds (divide by 3). The results are as follows:

- Low = 0-12
- Medium = 13-24
- High = 25-36

Continuing with this example, assume that for a particular route, the following numerical values have been determined and entered on the worksheet:

- Big Game Habitat = 6
- Unique Habitats = 0
- Fragmentation of Habitat = 6
- Connectivity = 0
- Noxious Weeds = 4
- Relict Plant Communities = 0
- Special Status Plant Species and Habitats = 3

In this case, the numerical total for this route is 17, and will receive a rating of “Medium”.

This is the same methodology that was used to complete the Aquatics/Fisheries, Soils, and Human Use route evaluations and ratings throughout the process.

After the Resource and Human Use analysis was completed for a travel planning area, the final ratings (Low, Medium, or High) for each route were entered onto the *Final Evaluation Table*. The Final Evaluation Table provides a format to compare the Resource Impact and Human Use ratings determined for each route for the particular travel planning area. The Final Evaluation Table includes a space for written comments to clarify the Interdisciplinary Team’s proposed management decisions.

As an example, assume the following final ratings for a particular route:

- Wildlife/Habitat Impact Rating – Low
- Aquatics/Fisheries Impact Rating – Low
- Soils Impact Rating – Medium
- Human Use Rating – High

For this example, the overall level of Resource impacts is Low, while the overall level of importance to Human Use is High. In this case, the ID team would likely propose to manage the route as Open, or perhaps Open/Restricted (seasonal restrictions) if Soil erosion were an issue. For a different route, the overall level of Resource Impacts might be High, while the overall importance to Human Use might be low; resulting in an Interdisciplinary Team proposal for Closure. In the above examples, there are no conflicts between the Resource Impact and Human Use ratings.

However, a wide range of variations for Resource/Human Use ratings is possible, and in some cases required discussion and negotiation by the Interdisciplinary Team to arrive at a proposed management decision. For example, there were a number of routes where Resource Impacts and Human Use needs both rated out as High. These situations required group discussion and negotiation in order to arrive at a proposed management solution.

Community Based Collaborative Working Groups

During spring 2004, BLM identified and prioritized 9 site specific areas needing travel planning. 5 of the 9 areas were identified as High Priority, and are being addressed concurrently with the RMP revision. The remaining 4 areas were identified as Moderate Priority, and will need to be addressed after the RMP, due to time constraints.

- 1) Helena (focus area- Scratchgravel Hills) - *High Priority*
- 2) East Helena (focus area- North Hills) - *High Priority*
- 3) Lewis and Clark Country Northwest (focus area- Marysville) - *High Priority*
- 4) Boulder/Jefferson City - *High Priority*
- 5) Upper Big Hole River - *High Priority*
- 6) Missouri River Foothills - *Moderate Priority*
- 7) Jefferson County Southeast - *Moderate Priority*
- 8) Broadwater County South - *Moderate Priority*
- 9) Park/Gallatin - *Moderate Priority*

Given their relative importance, a series of public scoping meetings were held for the 5 *High Priority* travel planning area during November and December 2004, and January 2005. The primary purpose of the meetings was to solicit site specific issues and concerns,

as well as potential solutions; to be used to help establish criteria governing decisions for travel planning. (e.g., issue/concern – noise/dust impacts from motorized OHV use near housing area ; solution – restrict/prohibit OHV use near housing area, establish minimum distance, criteria – establish/determine minimum distance from housing areas).

During the meetings, it became apparent that three of the travel planning areas - Lewis and Clark County Northwest (Marysville), Helena (Scratchgravel Hills), and East Helena (North Hills) were particularly important to the public and travel planning. Meetings for these 3 areas were well attended; interest in the Scratchgravel Hills required a second meeting.

Given the level of public interest, BLM decided to solicit the assistance of three community-based collaborative working groups, one for each travel planning area. Assisted in part by Tetra Tech (RMP contractor), the groups would work under the direct supervision and guidance of the Resource Advisory Committee (RAC).

Several press releases and letters of interest were issued by Tetra Tech during May 2005, soliciting applicants for each of the 3 travel planning areas. The mission of the collaborative working groups was to “assist in developing a travel management plan mutually agreeable to both the collaborative working groups and BLM”. Membership criteria included: Montana residency, familiarity with the travel planning area(s), and a willingness to work collaboratively with people of differing viewpoints. In addition, in accordance with the Federal Advisory Committee Act Members (FACA), members were selected from 3 different interest categories in order to provide for balanced representation.

BLM anticipated enough public interest to support 3 balanced working groups, composed of either 6 or 9 people total. Tetra Tech was tasked with selecting group membership (for subsequent approval by the RAC), and coordinating and facilitating all of the group meetings.

In late May, however, it became apparent that the RAC would not be able to sponsor the collaborative subgroups, due to time constraints and other unforeseen events. BLM contacted the Lewis and Clark County commissioners, who graciously agreed to sponsor the collaborative working groups under their direct guidance and supervision.

Due to a shortage of interested candidates, only 2 (rather than 3) balanced collaborative working groups were able to be selected, each composed of 9 members. Given its group membership, interest, and local knowledge, one of the groups was tasked with assisting the BLM develop travel management for both the Helena (Scratchgravel Hills) travel planning area as well as the East Helena (North Hills) travel planning area, while the second

group was selected to assist the BLM with the Lewis and Clark travel planning area (Marysville).

Michael McHugh, the Lewis and Clark County land planner, represented the county and chaired both working groups throughout the process. Each group held a series of 6 meetings during June and July, 2005. Each meeting was assisted by Tetra Tech, and attended by BLM staff that answered questions and provided and information feedback from the BLM's Interdisciplinary Team as needed. In addition, BLM provided a full range of maps and other travel planning information used by its own interdisciplinary travel planning team, including its preliminary travel planning recommendations for each of the 3 travel areas. (See list of supportive documents on page 2 of "Guidance for BLM Travel Planning Subgroups").

Group decisions were based on consensus. In the end, the working groups were able to arrive at complete consensus for the Marysville and North Hills areas, but only partial consensus for the Scratchgravel Hills area.

From August 2005-October 2005, the BLM Interdisciplinary team met and developed a range of alternatives (A-D) for each of the 5 travel planning area. With the exception of some minor changes, the community based collaborative working group proposals were incorporated under Alternative B, the Preferred Alternative.

Butte Field Office Travel Plan Variance Process/Application Form

Travel plan variances are requests by the public, commercial interests, interagency personnel, or BLM personnel to temporarily use motorized vehicles on closed roads, seasonally restricted roads, and cross country (off road) use. The following process has been developed to address requests for motorized travel not

already authorized by a prior decision based on analysis in an existing EIS, EA, or the provisions of a permit, lease, memorandum of understanding, or right of way. It is also intended to provide additional oversight for uses already generally authorized under the 2003 Statewide OHV ROD and Instruction Memorandum #MT-2001-004 regarding administrative uses.

Variance requests that cannot be approved due to issues raised during review would be subject to the NEPA process, or Documentation of NEPA adequacy (DNA). A DNA is documentation of whether or not there is existing NEPA documentation to cover the proposal. If the variance request cannot pass this "test", additional NEPA documentation is required.

The process is initiated by the program lead requesting the variance, or who has received a request from the public. After completing the basic information on the variance form, the flow chart should be circulated among the respective specialists for consultation and overall review.

Example requests for variances include (but are not limited to):

- Access to private property (patented mine claim, mining claim location and assessment work, seasonal cabin)
- Casual use mineral exploration (refer to 43 CFR 3809.5)
- Permit lease administration (firewood collection, recreation)
- Agency administrative work
- Contract work or contract administration
- Other permit leases

Flowchart

(Please document your responses, as needed, in the space next to the question. Use "N/A" for issues and concerns not applicable to the request).

Does the request provide reasonable use of public lands? — **No-----No Variance**

Must be Yes to continue

Yes

Are there reasonable, alternative routes available? — **Yes-----No Variance**

Must be No to continue

No

Is the activity in a WSA?

(Exceptions – Grandfathered rights, valid existing rights, use of an existing way) — **Yes-----No Variance**

Must be No to continue

No

Is the road safe to use during the requested time period? — **No-----No Variance**

Must be Yes to continue

Yes

Can the activity be postponed until the road or area is open to motorized use? — **Yes -----No Variance**

Must be No to continue

No

Can resource impacts be sufficiently mitigated?

(Winter range, spring calving habitat, Threatened and Endangered species habitat, sensitive species habitat, sensitive soils, soils susceptible to erosion, water quality, spread of noxious weeds, etc.) — **No-----No Variance**

Must be Yes to continue

Yes

Can social conflicts (as analyzed) be sufficiently mitigated? — **No ----- No Variance**

Must be Yes to continue

Yes

Yes – Variance may be approved by Authorized Officer (refer to Variance Request Form for signature)

Respective Program Reviewers:

Program Lead	Signature	Date
CULTURAL		
FORESTRY		
REALTY		
WILDLIFE/T&E		
GEOLOGY		
SOIL/WATER/AIR		
HAZMAT/AML		
RANGE/WEEDS		
RECREATION/WILDERNESS/VRM		
RIPARIAN		
FIRE/FUELS		
TRAVEL MANAGEMENT		

USDI BUREAU OF LAND MANAGEMENT
Butte Field Office
106 North Parkmont, Butte, Montana, 59701
Telephone 406-533-7600

Authorization No. _____

AUTHORIZATION FOR MOTORIZED USE OF ROAD, TRAIL, OR AREA WITH TRAVEL RESTRICTIONS

When approved by the authorized officer, this permit authorizes:

Name: _____

Address: _____

(City, State)

(Zip)

Telephone Number (s): _____

(List additional authorized users on back of form)

To use the following road (s), trails, or area with travel restrictions (indicate entry locations and travel areas):

In order to conduct the following operations:

Dates/Time of Use:

Number and Type(s) of Vehicles:

(See other side)

Standard Stipulations

Copy of variance to be kept with authorized vehicle (s) and displayed in window.

Variance restricted to authorized (listed) individuals only

Permittee shall notify BLM of any changes under this authorization

Post sign or notice (on gate or beginning of restricted road) stating reason for use. Close/Lock gates when entering and leaving closure area

Vehicle use limited to ingress and egress only, using the authorized route, and minimum number of vehicles and trips.

No off road travel allowed, unless specifically authorized under this variance.

Avoid wet areas; travel only when ground is dry to prevent ruts and resulting erosion

Wash vehicles prior to use on BLM lands to prevent introduction of weeds

During fire operations - May use ATVs and engines on any existing road or trail that accesses treatment area. Off road use restricted for fire holding, mop up, and any related suppression needs. Off road vehicle use should be avoided during the general rifle hunting season. No new trails are to be created

During hunting season - Vehicles shall not be used for hunting purposes on BLM lands. Use limited to ingress/egress only after dark or between the hours of 11 AM to 3 PM (with the exception of emergencies).

I (we) acknowledge that I (we) am (are) required to comply with any conditions or stipulations of the authorized officer when the permit is issued:

(Applicant signature/date)

Butte Field Office Manager Action

Special Stipulations (if any):

_____ Variance Approved

This application is hereby approved subject to the Standard stipulations and Special stipulations (if any) listed above:

(signature/date)

_____ Variance Denied

This application has been denied for the following reasons:

See attached letter.

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4, and the enclosed Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (request) pursuant to regulation 43 CFR 8342 for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

APPENDIX B - VISUAL RESOURCE MANAGEMENT CLASSES

Visual resource classes are categories assigned to public lands. The classes serve two purposes: (1) an inventory tool that portrays the relative value of the visual resources, and (2) a management tool that portrays the visual management objectives. There are four classes, I, II, III, and IV, as described below.

Visual resource management classes are assigned through RMP's. The assignment of visual management classes is ultimately based on the management decisions made in RMP's. However, visual values obtained through the visual resource inventory must be considered throughout the RMP process. All actions proposed during the RMP process that would result in surface disturbances must consider the importance of the visual values and the impacts the project may have on these values.

Management decisions in the RMP must reflect the value of visual resources. In fact, the value of the visual resource may be the driving force for some management decisions. For example, highly scenic areas which need special management attention may be designated as scenic Areas of Critical Environmental Concern and classified as VRM Class I based on the importance of the visual values.

Visual Resources will continue to be managed in accordance with the BLM 8400 Manual. All existing inventory data will be maintained and utilized when assessing visual impacts and needed contrast ratings for future management actions.

VRM	Class Objectives
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

APPENDIX C – USE OF THE SIMPPLLE MODEL

USE OF THE SIMPPLLE MODEL IN DEVELOPING RMP ALTERNATIVES

General Overview

Simulating Patterns and Processes at Landscape Scales (SIMPPLLE) is a computer modeling program that simulates vegetation patterns and processes emphasizing the dynamics of landscaped level change. It was developed for the USDA Forest Service, Region 1 as a management tool. SIMPPLLE's purpose is to help provide an understanding of the dynamics of where processes will occur across a landscape. The SIMPPLLE model has been utilized by the Beaverhead-Deerlodge National Forest during their Forest Plan Revision and during the BLM's Dillon Field Office Resource Management Plan revision.

SIMPPLLE was selected for use by the Butte Field Office (BFO) because it is both spatially and temporal explicit, meaning that landscape level vegetation change can be explored in relation to location and neighboring vegetation communities, as well as change within these communities over time. The SIMPPLLE model was used to: (a) simulate future vegetation changes caused by various disturbance processes at multiple landscape scales, (b) show trends in vegetative communities over the next 50 years as a result of fire suppression, (c) simulate historic vegetative conditions by running the model over 500 years with variables such as fire, insect and disease activity, (d) simulate management treatment alternatives for their impact on disturbance processes and the attainment of desired conditions defined at the landscapes scale, and (e) to provide a basis for identifying the probability of disturbance processes and vegetation conditions.

Vegetation Layer

At the time the Resource Management Plan revision began the Butte Field Office lacked a current comprehensive GIS vegetation layer for the planning area. This vegetation layer was needed in order to determine the existing condition, calculate potential treatment acres and to conduct effects analysis. It was determined that the existing Forest Service Potential Natural Vegetation (PNV) layer was not adequate for our purposes due to the small size and scattered ownership of BLM lands within the planning area.

A Vegetation Subgroup was established and tasked with creating this digital vegetation layer and using it to run the SIMPPLLE model. This subgroup consisted of seven members: two foresters, a wildlife biologist, a fire/fuels specialist, a soil scientist, a riparian/range/special status plants specialist, and a GIS specialist.

Ssurgo soil survey data was obtained from the Natural Resources Conservation Service (NRCS) for BLM managed and private lands within the Butte Field Office for Jefferson, Broadwater, Lewis and Clark, Gallatin, and Deerlodge counties. As a majority of these lands were determined to be grasslands it was assumed that potential vegetation was the same as the existing situation. As a result of Silver Bow County not having a completed Ssurgo soil survey completed the soil scientist for the Butte Field Office generated a vegetation map for the county based on his extensive knowledge of the area. Park County also did not have a published county soils survey, so a Potential Natural Vegetation coverage obtained from the US Forest Service (Fire Sciences Laboratory, Rocky Mountain Research Station, 2001) was used to fill in any data gaps. This data layer was also used to fill any data omissions on the Gallatin National Forest.

Soil and vegetation data relating to national forest lands was obtained from both the Beaverhead-Deerlodge and Helena National Forests. Forest Service soil data was used in conjunction with Forest Service stand data to determine potential natural vegetation Forest Service timber stand data was merged with the county soil survey data.

The county soil surveys lumped grassland and sagebrush habitat as grasslands. To map sagebrush habitat, our special status plants specialist created a map depicting sagebrush. Ssurgo soil survey data from NRCS for BLM and private lands in the Butte Field Office for Jefferson, Broadwater, Lewis and Clark, Gallatin, and Deerlodge Counties was queried for polygons which show big sagebrush as part of the characteristic vegetation. This map was then merged with the vegetation map the BFO Soil Scientist created for Silver Bow County. Professional knowledge and data collected by the Northwinds contractor were used to check and fill in gaps. Park county and Beaverhead county were not included due to incomplete soil survey data.

The BLM has detailed forest stand data that was merged into the vegetation data. A crosswalk was developed to move the forest stand data from the existing database, Forest Vegetation Information System (FORVIS), to the vegetation coverage. The crosswalk included data for the following attributes: cover class, density, habitat type, size class, species type, dominant vegetation, and potential vegetation. This crosswalk then allowed data required to run the SIMPPLLE model to be extracted from the vegetation coverage.

Encroachment for grasslands was mapped using orthophotos to run the model. Encroachment for sagebrush polygons was not mapped by the time the model was run (7/05) but was mapped in August, 2005 in the vegetation coverage. Discuss how acres of treatment would be identified between encroachment in grassland and sagebrush.

Agriculture, Urban and Mining lands were mapped using orthophotos for Deerlodge, Silver Bow, Jefferson, Lewis and Clark and Broadwater Counties and merged into the vegetation coverage. In Park and Gallatin Counties, agriculture lands were mapped using the FS Potential Natural Vegetation Grid.

All polygons less than eight acres in size were merged with adjacent polygons.

To run the SIMPPLLE Model, large polygons were broken down to polygons less than 250 acres in size. Insect and disease from the 2003 survey flights was provided by the Forest Service was added to the SIMPPLLE model database in an attempt to accurately represent the existing ground condition. The model was able to break out and summarize data for the 7 major watersheds in the field office.

SIMPPLLE Process

1. Gathering Data

Jimmie Chew and Chris Stalling started working with the Butte Resource Management Plan group in 2003. Discussion at this first stage centered on the data requirements for running a landscape analysis using the SIMPPLLE model. Data needs for running SIMPPLLE included a GIS coverage (ArcInfo format with polygon topology), with attributes of species, size class, and density for each vegetation polygon, as well as some way to stratify the vegetation (i.e. habitat group). Other optional attributes that enhance SIMPPLLE simulations and representation of the landscape include land ownership, a code indicating the presence or absence of roads, fire management zones, prior landscape processes (i.e. insect disease and activity), and a "special area" field that can be filled with anything the user decides would help to logically represent the landscape. An ArcInfo Digital Elevation Model (DEM) for the same spatial extent as the vegetation coverage is necessary to create a neighbor file, which, when paired with a vegetation file derived from the ArcInfo coverage, loads into SIMPPLLE to create a landscape ready for simulation (a file with the .area extension).

Managers must also consider the size of the area that will best represent their goals. Since SIMPPLLE is a landscape level, process driven, spatially explicit simulation model, vegetation as it is represented on the entire landscape will influence and be influenced by the processes that cause change over time and space. In order for all vegetation polygons to be included in SIMPPLLE simulations, a contiguous landscape must be

used with all polygons populated with vegetation information including water and nonforest conditions including rock and agriculture. This initial data-gathering step was accomplished by the Butte Field Office (BFO) working with a contractor, Dave Highness from Tetra Tech.

2. Cross-walk and Data Loading

Once the BFO had pulled this information together and discussed the approach to building a cross-walk from their data into SIMPPLLE attributes with Chris Stalling, they put together their first cut. The SIMPPLLE User's Guide describes the attributes and can be downloaded from

<http://www.fs.fed.us/rm/ecology/publications/simpplle/>.

Several errors were found by BFO personnel, and they worked through editing and resolving these errors with Chris Stalling. Errors are expected to be found a majority of the time following a cross-walk to SIMPPLLE attributes; the cross-walk is iterative and subject to expert knowledge of the most likely vegetation expected at specific locations on the landscape. Once the initial vegetation attributes were examined by the BFO, discussion followed with Jimmie Chew and Chris Stalling about whether specific vegetation pathways should be developed for the Butte landscape in order to improve model behavior; several nonforest pathways were then adjusted.

Analysis of initial model behavior was accomplished by considering the landscape as current and looking at vegetation change over several decades, or time-steps, as they are represented in the SIMPPLLE environment. Further analysis was accomplished on a representation of historical landscape conditions by running simulations out for several hundred years without fire suppression and then saving the "new" landscape as one example of the historical Butte landscape. From this new starting point, SIMPPLLE simulations were run and the output was compared to that obtained from the current condition. Users have the option to make multiple landscape representations so that various approaches to stratification can be tested such as breaking the landscape by ownership, or by differences in the special area field.

3. Adjusting the Vegetation

An initial iteration of a SIMPPLLE landscape representation provides managers with the opportunity to consider how well the vegetation is being modeled. Further adjustment of vegetation states as well as other aspects of vegetation change was accomplished by the BFO with some interaction by telephone and in meetings in Butte. Resultant files that augmented model behavior were developed for vegetation pathways, vegetation regeneration, and conifer encroachment. Further comparisons of current and historical conditions were made similar to the earlier iteration.

4. Processes

Fire is the most extensive process on the Butte landscape and time was spent working on fire behavior with Charles Tuss. Files were developed to augment this behavior including better representations for fire occurrence, fire management zones (fire history based on data that can be provided from PCHA), and fire spread. Analysis of model behavior was conducted in a meeting at the BFO with Jim and Chris by running simulations of current and historical landscapes. Model behavior was analyzed using output comparisons as described above.

5. Alternative Development

Charles worked with Jim in Missoula at the RMRS to develop management plan alternatives for the BFO. They discussed model treatment logic in SIMPPLLE and how to alter that logic for simulation. Jim added a "cutting" treatment for the WUI, dropped the follow-up treatment to "group selection," changed the "density change" logic for "commercial-thinning" (added density of 2 along with 3), and made changes to the follow-up treatment for "encroachment-thin-and-burn" and "ecosystem-thin-and-burn." Jim and Charles also made changes to allow selection of JUSC for cutting. They ended up with treatment schedules for the RMP alternatives. Variables that were considered in development of the treatment schedule for alternative development were:

1. Sleeping Giant and Sheep Creek WSA/ACEC, Elkhorn WSA, Black Sage WSA, Humbug Spires WSA, – no acres were identified for treatment in these areas
2. We considered the effects of treatment in designated semi-primitive areas (including ROS and VRM categories).
3. Recreation sites and lands adjacent to recreation sites were taken into account.
4. Adjacent land ownership and management was taken into account.
5. Access to lands for treatment was considered. Including the existing road system.
6. Budget was NOT used during identification of acres for treatment.
7. Urban interface was taken into consideration and a "heavy-handed" approach was used in these areas. These areas were not identified for "ecosystem restoration." The Wildland Urban Interface Communities at Risk Hazard Assessment, 2004 – (The Helena Valley) was used as a tool for assessment.
8. Past treatments (logging and fire) as well as past wildfires were considered.

9. Topographical features (including rocky and steep sites) were taken into account.
10. Wildlife habitat including elk winter range, corridors, security habitat and habitat for sensitive species was considered.
11. We addressed errors in the vegetation coverage and made corrections based on professional knowledge of the area.
12. We used the Simpplle Model historical reference for each major watershed to guide us in determining the number of acres treated.

Riparian –

Polygons which had FORVIS data were selected from the BFO vegetation layer. It was assumed that if the polygon had FORVIS data it was/is forested. The BFO riparian layer was then queried for FAR reaches. The FAR selection was then clipped based on the FORVIS selection to get a forested FAR riparian shapefile. The clipped selection had repeated lengths which rendered acreage calculations impossible. The forested FAR riparian shapefile was then buffered by 200 feet. The buffer shapefile was converted to a coverage to produce an estimate of forested FAR riparian acres. This procedure was repeated for NFU and PFC reaches to get forested riparian acres for those as well.

Forested Riparian

FAR	3,037 acres	or	63 Miles
NFU	937 acres	or	19 Miles
PFC	3,725 acres	or	77 Miles

To get grass/shrub riparian acres, the FAR, PFC and NFU selections were summarized to get total lengths for each. These figures were used to derive acres by multiplying the total length by 400 feet (200ft buffer on each side) and dividing by 43,560. Forested riparian acres were subtracted to get "wide grass" acres. This figure was converted to square feet and divided by 400 to get back to lineal feet. The resulting figure was multiplied by 200 feet (100ft buffer on each side) and divided by 43,560 to get back to "narrow or actual" grass/shrub riparian acres as follows:

Grass/Shrub Riparian

FAR	1,228 acres	or	51 miles
NFU	499 acres	or	21 miles
PFC	1,703 acres	or	70 miles

Each FAR reach was reviewed and an estimation was made as to whether the reach could be treated or not through a fuels project, a forestry project or a prescribed burn project. This estimation was based on whether the reach was in a forested polygon, and the riparian coordinator's personal knowledge of each reach. Notations were made as to whether reaches had such

problems as roads, altered flows, small land ownership, historical mining etc. Some of these determinations were based upon the riparian coordinator's personal knowledge of each reach—the riparian coordinator has visited approximately 75% of the reaches. The riparian coordinator also made an estimation whether reaches could be treated (or are being treated) by grazing practices, exclosures, AML reclamation etc. These reaches were then intersected with the FAR buffer polygon to derive acres.

FAR Treatable Acres

Fuels/forestry/prescribed burns 1,966 acres

AML reclamation, grazing, exclosures, weed treatment
689 acres

Limited treatment forested due to roads, ownership etc.
1,072 acres

Limited treatment grass/shrub due to roads, mining, etc.
542 acres

PFC Maintenance riparian acres

The riparian coordinator then went through each PFC reach and made an estimation as to whether the reach may be treated or not through a fuels project, a forestry project or a prescribed burn project to maintain the functioning condition of the reach. This estimation was based on whether the reach was in a forested polygon, whether the reach was in a WSA, whether the reach was along a major river (all major rivers were excluded from treatment—i.e. Yellowstone, Missouri, Jefferson, etc.) and personal knowledge of the riparian coordinator. The resulting reaches were then intersected with the PFC buffer polygon to derive acres.

PFC Maintenance Acres

Fuels/forestry/prescribed burns 1,789 acres

6. Simulation Output and Reports

Once SIMPPLLE was behaving in an acceptable manner, simulations for current with no management, historical, and current with management treatments applied were run. Macros for Excel are used with model output to display data trends and some time was spent working with the RMRS to put together displays. These include current trends and historical range of variation.

I

Watershed	FAR Treatable -Forest	FAR Limited Treatment- Forest	FAR Treatable- Grass/Shrub	FAR Limited Treatment- Grass/Shrub	PFC Main- Forest
Yellowstone	0	0	0	21	48
Big Hole	774	129	111	267	633
Upper Missouri	575	472	297	154	859
Jefferson	593	471	278	71	249
Gallatin	0	0	0	29	0
Upper Clark Fork	24	0	3	0	0
Blackfoot	0	0	0	0	0
Total	1,966	1,072	689	542	1,789

II

Watershed	FAR Forest Total	NFU Forest Total	PFC Forest Total	FAR Grass/Shrub	NFU Grass Shrub	PFC Grass/Shrub
Yellowstone	0	0	62	21	0	267
Big Hole	903	0	1,207	378	37	614
Upper Missouri	1,047	595	1,699	451	310	549
Jefferson	1,064	342	665	349	153	273
Gallatin	0	0	0	29	0	0
Upper Clark Fork	24	0	0	3	0	0
Blackfoot	0	0	92	0	0	0
Totals	3,038	937	3,725	1,231	500	1,703

APPENDIX D – BEST MANAGEMENT PRACTICES

The publications referenced in this appendix are sources of “Best Management Practices” (BMPs). BMPs are measures that have been developed by agency, industry, scientific, and/or working groups as voluntary methods for reducing environmental impacts associated with certain classes of activity. BLM typically uses these measures as guidelines or “project design features” during implementation planning at the activity and/or project-specific levels.

The list included in this appendix is not limiting, but references the most frequently used sources. As new publications are developed, BLM may consider those BMPs. In addition, many BLM handbooks (such as BLM Manual 9113-Roads and 9213-Interagency Standards for Fire and Aviation Operation) also contain BMP-type measures for minimizing impacts. These BLM-specific guidance and direction documents are not referenced in this appendix.

Planning implications: Use of Best Management Practices is not mandatory, since individual measures may not be appropriate for use in every situation. They may be added, dropped, or modified through plan maintenance.

NEPA implications: Only the wind energy development BMPs have been analyzed in a NEPA process. The use of other BMPs should be analyzed on a case-by-case basis in NEPA documents associated with projects on the public lands. These case-by-case analyses should not “tier to” the BMP publication as a way to dismiss environmental impacts (i.e., must still analyze and disclose the environmental considerations and effects associated with use of the BMP).

Montana Best Management Practices for Grazing

Developed by: Working group with representation from: MSU College of Agriculture, Society of American Fisheries, Montana Stockgrowers Association, Montana Woolgrowers Association, USDI Bureau of Land Management, USDA Forest Service, USDA Natural Resources Conservation Service, Montana Farm Bureau, and Montana Dept. of Natural Resources and Conservation.

Publication reference: N/A, first printed in 1999

Available From: Conservation Districts Bureau, DNRC, PO Box 201601, Helena MT 59620-1601 (406-444-6667).

Description: Describes BMPs for livestock grazing designed to protect and enhance water quality, soils, plant communities, and other rangeland resources. Explains how and why to use BMPs to manage upland rangeland, forested rangeland, and riparian areas; and describes how grazing BMPs fit into a grazing management plan

Water Quality BMPs for Montana Forests

Developed by: Montana State University Extension Service

Publication reference: EB158, 2001

Available From: MSU Extension Forestry, 32 Campus Dr, Missoula MT 59812, OR MSU Extension Publications, PO Box 172040 Bozeman MT 59717

Description: Discusses methods for managing forest land while protecting water quality and forest soils. Intended for all forest land in Montana, including non-industrial private, forest industry, and state or federally-owned forests. These are preferred (but voluntary) methods that go beyond Montana State Law (Streamside Management Zones). Includes definitions, basic biological information, and BMPs for Streamside Management Zones; road design, use, planning and locating, construction, drainage, and closure; stream crossings, soil, timber harvesting methods, reforestation, winter planning, and clean-up.

Montana Placer Mining BMPs

Developed by: Montana Bureau of Mines and Geology

Publication Reference: Special Publication 106, October 1993

Available from: Montana Bureau of Mines and Geology, Main Hall, Montana College of Mineral Science and Technology, Butte MT 59701

Description: Provides guidelines for planning, erosion control, and reclamation in arid to semi-arid, alpine, and subalpine environments, to prevent or decrease environmental damage and degradation of water quality.

BMPs for Wind Energy

Developed by: Bureau of Land Management

Publication reference: Wind Energy Development Programmatic EIS

Available From: FEIS Chapter 2 (section 2.2.3.2) at <http://windeis.anl.gov/>

Description: As part of the proposed action, BLM developed BMPs for each major step of the wind energy development process, including site monitoring and testing, plan of development preparation, construction, operation, and decommissioning. General BMPs are available for each step, and certain steps also include specific BMPs to address the following resource issues: wildlife and other ecological resources, Visual resources, Roads, Transportation, Noise, Noxious Weeds and Pesticides, Cultural/Historic Resources, Paleontological Resources, Hazardous Materials and Waste Management, Storm Water, Human Health and Safety, monitoring program, air emissions and excavation and blasting activities.

Montana Guide to the Streamside Management Zone Law

Note: The Montana Guide to the Streamside Management Zone Law is a field guide to compliance with State of Montana Law 77-5-301[1] MCA.

Developed by: Montana Department of Natural Resources and Conservation Service Forestry Bureau, in cooperation with Montana Department of Environmental Quality, Montana Logging Association, Montana Wood Products Association, Plum Creek Timber LP, USDA Forest Service, USDI Bureau of Land Management

Publication reference: Revised August 2002

Available From: Montana Department of Natural Resources and Conservation, 2705 Spurgin Road, Missoula MT 59801-3199, (406)542-4300, or local MT DNRC field office.

Description: MT State Law (77-5-301[1] MCA). Complementary BMPs are found in the Water Quality BMPS for Montana Forests (also referenced in this appendix). Provides definitions, stream classifications, and guidelines on the seven forest practices prohibited by Montana law in SMZs (broadcast burning, operation of wheeled or tracked vehicles except on established roads, the forest practice of clearcutting, the construction of roads except when necessary to cross a stream or wetland; the handling, storage, application, or disposal of hazardous or toxic materials in a manner that pollutes streams, lakes, or wetlands, or that may cause damage or injury to humans, land, animals, or plants; the side casting of road material into a stream, lake, wetland, or watercourse; and the deposit of slash in streams, lakes, or other water bodies.

Erosion and Sediment Control Practices: Field Manual

Developed by: Prepared for the Montana Department of Transportation

Publication reference: FHWA/MT-030003/8165

Available From: National Technical Information Service, Springfield, VA 21161

Description: The Erosion and Sediment Control Best Management Practices Construction Field Manual was developed to assist in design, construction, and post-construction phases of MDT projects. This manual provides background to concepts of Erosion and Sediment Control. Most of MDTs Best Management Practices are listed within the manual based on application categories. Each BMP is described; its applications and limitations are listed, as well as its design criteria. Construction phase and post-construction phase BMPs are described. This manual is a field guide and condensed version of the Erosion and Sediment Control Design Construction Best Management Practices Manual. For more detailed discussion on topic found within, refer to the Erosion and Sediment Control Construction Best Management Practices Manual.

Erosion and Sediment Control Practices: Reference Manual

Developed by: Prepared for the Montana Department of Transportation

Publication reference: FHWA/MT-030003/8165

Available From: National Technical Information Service, Springfield, VA 21161

Description: The Erosion and Sediment Control Construction Best Management Practices Manual was developed to assist in the design, construction, and post-construction phases of MDT projects. This manual provides background to State and Federal regulations associated with erosion and sediment control practices including a general overview of the erosion and sediment processes. Best Management practices are listed within the manual based on application categories. Each BMP is described; its applications and limitations are listed, as well as its design criteria. The design phase includes development of construction plans, NOI, and SWPPP. Construction phase includes the finalization of the SWPPP, NOI, and the implementation of BMPs. Post-Construction phase includes monitoring, maintenance, and removal activities.

BMPs for Fluid Minerals

Developed by: Bureau of Land Management

Publication reference BLM/WO/ST-06/021+3071

Available from: Online at: <http://www.blm.gov/bmp/>

Online at: <http://www.mt.blm.gov/oilgas/operations/goldbook/goldbook1.html>

Online at: http://www.mt.blm.gov/oilgas/operations/goldbook/Stand_Enviro_Color.pdf

Online at: <http://www.mt.blm.gov/oilgas/operations/color.pdf>

Description: BMPs for oil and gas demonstrate practical ideas which may eliminate or minimize adverse impacts from oil and gas development to public health and the environment, landowners, and natural resources; enhance the value of natural and landowner resources; and reduce conflict. The publication reference is to the "Gold Book" which is formally titled "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development." In addition, the first internet citation is to a location maintained by the Washington Office of the BLM containing general and technical information on the use and application of BMPs. The second location refers the reader directly to an online version of the "Gold Book." The third and fourth locations refer the reader to color charts for use in selecting paint colors for oil and gas facilities.

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APPENDIX E – LAND HEALTH STANDARDS

STANDARDS FOR RANGELAND HEALTH AND GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT BUTTE DISTRICT

Preamble

The Butte Resource Advisory Council has developed standards for rangeland health and guidelines for livestock grazing management for use on the Butte District of the Bureau of Land Management (BLM). The purpose of the standards and guidelines are to facilitate the achievement and maintenance of healthy, properly functioning ecosystems within the historic and natural range of variability for long-term sustainable use.

The Butte Resource Advisory Council determined that the following considerations were very important in the adoption of these standards and guidelines:

1. For implementation, the BLM should emphasize a watershed approach that incorporates both upland and riparian standards and guidelines.
2. The standards are applicable to rangeland health, regardless of use.
3. The social and cultural heritage of the region and the viability of the local economy, are part of the ecosystem.
4. Wildlife is integral to the proper function of rangeland ecosystems.

Standards

Standards are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Achieving or making significant progress towards these functions and conditions is required of all uses of public rangelands as stated in 43 Code of Federal Regulations 4180.1. Baseline, monitoring and trend data, when available, should be utilized to assess compliance with standards.

Butte STANDARD #1: Uplands are in proper functioning condition.

- As addressed by the preamble to these standards and as indicated by:

Physical Environment

- erosional flow patterns;
- surface litter;
- soil movement by water and wind;

- soil crusting and surface sealing;
- compaction layer;
- rills;
- gullies;
- cover amount; and
- cover distribution.

Biotic Environment

- community diversity;
- community structure;
- exotic plants;
- photosynthesis activity;
- plant status;
- seed production;
- recruitment; and
- nutrient cycle.

The determination of rangeland health should be based on the evaluation of three criteria: degree of soil stability and watershed function, nutrient cycles and energy flows, and available recovery mechanisms.

Indicators to assess soil stability and watershed function relate to two fundamental processes of watershed degradation: (1) Soil erosion by wind and water; and (2) infiltration or capture and utilization of precipitation. Indicators such as rills, gullies, flow patterns, pedestaling and compaction, may be used to assess watershed condition.

Indicators that can be used to evaluate nutrient cycles and energy flows relate to distribution of plants, litter, roots, and photosynthetic period; i.e., plant community diversity and structure, exotic plants, photosynthetic activity and plant status.

Recovery mechanisms or plant demographic indicators may include increasing vegetative cover, plant vigor, kind and number of seedlings, and changes in plant age distribution.

- Physical environmental features of a proper functioning watershed are indicated by:
 - little evidence of soil erosion by wind and/or water;
 - rills, gullies, pedestaling, flow patterns are not present (significant);
 - surface sealing and soil crusting is not evident;
 - plant (ground) cover and litter accumulation is adequate to protect site; and
 - natural disturbance events are integral to proper ecosystem function.
- Biotic environment features of a proper functioning watershed are indicated by:
 - variety and number of plant life-forms (grass, forb, shrub, tree, succulent) across the site;
 - plants exhibit a good diversity of size, height, distribution, and age/class well distributed;
 - exotic plants, weeds are absent or sparse on site;
 - plants display normal growth and root development;
 - photosynthesis activity occurs throughout the site;
 - plants are alive, productive with well developed root systems;
 - seed stalks/seed adequate for stand maintenance for all life-forms;
 - litter distribution and incorporation is uniform across site; and
 - nutrient/energy cycle mechanisms are adequate for plant maintenance.

Butte STANDARD #2: Riparian and wetland areas are in proper functioning condition.

- As addressed by the preamble to these standards and as indicated by:

Hydrologic

- flood plain inundated in relatively frequent events (1-3 years);
- amount of altered streambanks;
- sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region);
- riparian zone widening; and
- upland watershed not contributing to riparian degradation.

Erosion Deposition

- flood plain and channel characteristics; i.e., rocks, coarse and/or woody debris adequate to dissipate energy;
- point bars are vegetating;
- lateral stream movement is associated with natural sinuosity;
- system is vertically stable;
- stream is in balance with water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition); and
- bare ground.

Vegetation

- reproduction and diverse age structure of vegetation;
- diverse composition of vegetation;
- species present indicate maintenance of riparian soil moisture characteristics;
- streambank vegetation is comprised of those plants or plant communities that have deep binding root masses capable of withstanding high streamflow events;
- utilization of trees and shrubs;
- riparian plants exhibit high vigor;
- adequate vegetative cover present to protect banks and dissipate energy during high flows; and
- plant communities in the riparian area are an adequate source of large woody debris.

Broadly, "proper functioning condition" may be defined as the ability of a stream to perform its riparian functions. These functions include sediment filtering, bank building, water storage, aquifer recharge, and hydrologic energy dissipation.

No single factor or characteristic of a riparian site can provide a complete picture of either that site's condition or the direction of its successional change. Things considered "negative" in traditional evaluations of ecological sites may not be such for riparian sites. For example, the percent of exposed soil surface, which often reflects overgrazing or erosion on upland sites, may be a result of normal riparian activity; sediment deposition resulting after spring runoff, or a high water event.

Hydrology/Streambanks

The hydrology of a riparian area is perhaps its most important characteristic. Changes in hydrology may result in short and long-term vegetative changes. In some situations, construction (rip rap, roads, railroads,

etc.) has influenced the streambanks and stability has been increased over the natural levels. These streambanks may eventually lose their stability, and become altered. This generally occurs if the problems which caused the weak streambanks have not been remedied. Also, constructed streambanks (especially those with rip rap) will often disrupt the normal energy dissipation of the stream and eventually the meandering of a stream can result in the erosion of streambanks downstream.

Lateral Cutting

Lateral cutting is indicated by new stream-caused bank disruption along the outside of stream curves, and much less commonly along the straight portions of a stream. A high degree of active lateral cutting can indicate a degraded watershed.

Altered Streambanks

In many instances, land uses have degraded streambanks, accelerating stream movement across the flood plain. We define altered streambanks as those having impaired structural integrity (strength or stability) due to human-caused activities such as exposed soil surfaces from cattle trails and wallows, hiking and ATV trails, roads, logging skid trails, mining activities, etc.

Deep Binding Root Mass

Properly functioning streambanks are "armored by both vegetation and bank rock materials (e.g., boulders and cobbles). There have been few studies documenting the depth and extent of root systems of various plant species. Despite this lack of documented evidence, some generalizations can be made. All tree and shrub species are considered to have deep, binding root masses. Among riparian herbaceous species, the first rule is that annual plants do not have deep, binding root masses. Perennial species offer a wide range of root mass qualities. Some rhizomatous species, such as the deep-rooted sedges, are excellent streambank stabilizers. Other rhizomatous species such as Kentucky bluegrass, have only shallow root systems and are poor streambank stabilizers. Still others such as Baltic rush, appear to be intermediate in their ability to stabilize banks.

Downcutting

Active downcutting of a stream is often hard to recognize. Perched wetland vegetation and streambank features, plus the lack of a separate layer of channel bottom materials (i.e., the stream flows directly on the substrate materials), can be clues to downcutting. A stream is incised when downcutting of the stream has resulted in a width to depth ratio so low that average 2-year floods do not come out of the banks.

Soils/Geology

The soils and geology (landform and parent material) of a riparian site influence how the site reacts to

disturbances and changes over time. Changes in physical characteristics are often (but not always) more difficult to remedy through management actions than are vegetative changes. The depth and texture of soil, of a riparian site, influences the capacity of that site to hold water (act as a sponge) for prolonged late season flows and support desired vegetation.

Bare Ground

Exposed soil surface is important in evaluating the health of riparian areas for several reasons: (1) vulnerability to erosion; (2) it may contribute to, as well as reflect, streambank deterioration; (3) the more exposed soil, the less vegetation is available for soil protection and sediment entrapment; and (4) exposed soil provides opportunity for invasion by noxious weeds and undesirable species.

Vegetation

Because they are more visible than soil or hydrological characteristics, plants may provide early indications of riparian health.

Reproduction of Trees and Shrubs

One of the clearest indicators of ecological stability, and subsequent health, is the presence of all age classes (seedling, sapling, pole, mature, decadent, and dead) of tree and shrub species where the potential exists.

Dead and Decadent Trees and Shrubs

The amount of dead and decadent material in trees and shrubs is another indicator of the overall "health" of riparian areas. Large amounts of decadent and dead woody material can indicate severe stress due to high levels of browsing, and/or dewatering of the site from artificial or natural causes. If severe enough, this may change the potential from a riparian to an upland site. Large amounts of decadent and dead woody material may indicate fluctuations in climate, such as severe winter temperatures, spring freezes, or insect infestations. In all cases, the overall biotic health is affected and may have implications on physical features of a stream such as streambank integrity, channel incisement, and lateral cutting.

Utilization of Trees and Shrubs

Heavy utilization by livestock and/or wildlife can prevent the regeneration or establishment of woody species and, thus block succession of the plant community toward a later seral stage. As with herbaceous species, excessive use of these woody species may cause their elimination from the site and their replacement by disturbance-induced species or undesirable invaders.

Plant Composition

The presence of disturbance-induced herbaceous plants (either native or introduced) may indicate that the site could be more healthy and thus is not performing its

optimum riparian functions. Most of these species provide less soil holding and sediment trapping capability, and less desirable forage for livestock and wildlife.

Butte STANDARD #3: Water quality meets State standards.

- As addressed by the preamble to these standards and as indicated by:
 - dissolved oxygen concentration;
 - pH;
 - turbidity;
 - temperature;
 - fecal coliform;
 - sediment;
 - color;
 - toxins; and
 - other parameters: ammonia, barium, boron, chlorides, chromium, cyanide, endosulfan, lindane, nitrates, phenols, phosphorus, sodium, sulfates, etc.

When discussing rangeland health, water quality is a relative term which must be associated with water-use to become meaningful. Since the beginning of time, natural processes have influenced the chemical, physical, and biological characteristics of water. The natural quality of water varies from place to place, with the season of the year, with the climate, and with the kind of rock and soil through which water moves. After reaching the earth, water dissolves minerals from the earth's crust, percolates through organic materials such as roots and leaves, and reacts with living things such as microscopic organisms like plankton and algae. Natural water quality is changed by stream sediments; it is modified by temperature, soil bacteria, and evaporation. These and other factors determine the quality of nature's "impure" water.

Water quality criteria specify concentrations of water constituents which, if not exceeded, are expected to support an aquatic ecosystem suitable for higher uses of water. Water quality criteria are intended to protect essential and significant life in water, as well as the direct users of water, and also to protect life that is dependent on life in water for its existence.

- Some of the common indicators of water quality are:
 - Dissolved oxygen concentration (DO)-is a function of temperature of the water, altitude and barometric pressure. The ability of water to hold oxygen decreases with the increases in temperature, altitude and dissolved solids. This is important in fish spawning areas where DO

levels must be maintained at specific levels for good growth and general well being of fish and associated biota.

- pH (hydrogen-ion concentration)-is an indicator of acidity and/or alkalinity and an index of hydrogen-ion activity. Lower values indicated acid, higher values indicated alkaline. Fresh water organisms function properly if the pH ranges from 6.0 to 9.0 units. pH concentrations below the recommended level are toxic to fish and other aquatic organisms.
- Turbidity-is the disturbance of water due to the presence of suspended matter such as clays, silt, organic matter, and various effluents. It is the expression of the optical property of water. Excess turbidity reduces light penetration, which reduces photosynthesis by phytoplankton, and submerged vegetation.
- Temperature-is an important function which affects aquatic productivity. Temperature changes may result from natural climatic conditions due to man's manipulation of the riparian environment. Temperature is a function of location, season, time, duration of flow, depth, and many other variables. Aquatic biota are adapted to certain thermal conditions existing in the habitat for their survival and well being. The interrelationship between these conditions is so great that small changes in temperature may have far-reaching effects.
- Coliform groups-include bacteria organisms in their natural habitat and sources; i.e., feces, soil, water, vegetation, etc. Fecal coliform may be an indicator of recent fecal pollution. Other coliform organisms may be the result of plant and soil runoff water.
- Sediment-is a measure of suspended sand, silt, colloid and organic matter which will settle in time to the stream bottom. They originate from sources such as erosion, mine waste, plowed fields, construction projects, natural erosion, or vegetative manipulation. They may affect fisheries by covering the bottom of the stream or lake with a blanket of material that destroys the bottom fauna or spawning grounds for fish.
- Color-is attributed to substances in solution after the suspensoid have been removed. It may be organic or inorganic substances that affect photosynthesis activity in the water. Organic substances include humic materials, peat, aquatic plants, etc. Inorganic sources include iron and manganese compounds, chemicals, industrial waste, etc.
- Toxins-are those compounds or substances which are found in by-products or waste of the various

industries or activities that make their way into water sources which produce a variety of effects on fish or alter the biological productivity of water sources.

- Acceptable water quality is indicated by:
 - Dissolved oxygen concentrations-DO concentrations are being maintained at or near saturation levels.
 - pH-concentrations are at or near recommended State levels.
 - Turbidity-readings do not exceed Jackson Turbidity Unit readings for the water source.
 - Temperature-water temperature readings meet State standard preferred for good growth and productivity.
 - Coliform-organisms of the coliform group do not exceed State average for the site.
 - Sediment-water normally contains suspended solids that do not exceed State standard.
 - Color-water color does not limit or significantly restrict photosynthesis processes.
 - Toxins-levels are in conformance with State standard.

Butte STANDARD #4: Air quality meets State standards.

- As addressed by the preamble to these standards and as indicated by:

Section 176(c) of the Clean Air Act, which states that activities of all Federal agencies must conform to the intent of the appropriate State Air Quality Implementation Plan and not:

- cause or contribute to any violations of ambient air quality standards;
- increase the frequency of any existing violations; and
- impede the State's progress in meeting its air quality goals.

Montana Air Quality Standards

PM-10	50 $\mu\text{g}/\text{m}^3$ annual average 150 $\mu\text{g}/\text{m}^3$ 24-hour average*
Sulfur Dioxide	0.02 ppm annual average 0.10 ppm 24-hour average * 0.50 ppm 1-hour average **
Carbon Monoxide	23 ppm hourly average* 9.0 ppm 8-hour average *
Nitrogen Dioxide	0.05 ppm annual average 0.30 ppm hourly average*
Ozone	0.10 ppm hourly average*
Lead	1.5 $\mu\text{g}/\text{m}^3$ 90-day average
Foliar Fluoride	35 $\mu\text{g}/\text{g}$ grazing season average 50 $\mu\text{g}/\text{g}$ monthly average
Settled Particulate	10 mg/m^2 30-day average Matter (dustfall)
Hydrogen Sulfide	0.05 ppm hourly average*
Visibility	particle scattering coefficient of 3×10^{-5} per meter annual average***

* Not to be exceeded more than once per year.

** Not to be exceeded more than 18 times per year.

*** Applies to PSD mandatory Class I areas.

ppm = parts per million

$\mu\text{g}/\text{g}$ = micrograms per gram

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

The Clean Air Act established the Prevention of Significant Deterioration (PSD) regulations which set limits for increases in ambient pollution levels and established a system for preconstruction review of new major air pollution sources. Three PSD classes have been established: Class I, Class II, and Class III. Class I areas consist of all international parks, national parks greater than 5,000 acres, national wilderness areas greater than 5,000 acres, and national wildlife refuges which existed on August 7, 1977, when the amendment was signed into law.

Protection of air quality is provided to Class I areas by severely limiting the amount of additional human-caused air pollution which can be added. All other areas, except non-attainment areas, are classified as Class II in which a greater amount of additional human-caused pollution may be added. In no case, however, may pollutant concentrations exceed the National or State ambient air quality standards.

Butte STANDARD #5: Provide habitat as necessary, to maintain a viable and diverse population of native plant and animal species, including special status species.

- As addressed by these standards and as indicated by:
 - plants and animals are diverse, vigorous and reproducing satisfactorily, noxious weeds are absent or insignificant in the overall plant community;
 - spatial distribution of species is suitable to ensure reproductive capability and recovery;
 - a variety of age classes are present;
 - connectivity of habitat or presence of corridors prevents habitat fragmentation;
 - diversity of species (including plants, animals, insects and microbes) are represented; and
 - plant communities in a variety of successional stages are represented across the landscape.

BLM is charged with managing and developing habitat for a large variety of fish, wildlife, and special status species of plants. Basic habitat considerations can be categorized as including food, water, cover, and space. Specific habitat requirements often vary depending on what geographic area is being considered, species which are present, and the nature and extent of other uses which may be competing. A review of components of the above listed standards (Proper Functioning Riparian-Wetland areas, Uplands and Water Quality) will provide much of the requirements needed to achieve fish, wildlife, and special status plant habitat.

Guidelines

Butte GUIDELINE #1:

Manage grazing to maintain or improve watershed vegetation, biodiversity, and flood plain function. Maintain or improve riparian vegetative cover and structure to trap and hold sediments during run-off events to rebuild streambanks, restore/recharge aquifers, and dissipate flood energy. Promote deep-rooted herbaceous vegetation to enhance streambank stability. Where potential for woody shrub species (willows, dogwood, etc.) exists, promote their growth or expansion to aid in controlling access to streambanks, and to provide wildlife cover.

Butte GUIDELINE #2:

Pastures and allotments will be periodically inventoried to determine their relative suitability for livestock grazing. Topography, slope, distance from water, or vegetation habitat types, wildlife, channel types, soil types, and other resource values must be considered when determining grazing potential. Specific areas could be excluded from grazing, fenced into separate management pastures, or managed more intensively.

Butte GUIDELINE #3:

Management strategies for livestock grazing should produce sustainable hydrological, vegetative, and soil conditions. Thresholds for acceptable streambank alteration and vegetation utilization can be site-specific, and they should be the basis for establishing terms and conditions for allotments. These thresholds should be consistent with standards and result from application of scientifically acceptable hydrological and biological principles. Each allotment must have a monitoring plan, and monitoring results should be critical input to grazing system design. Long-term analysis of trend shall be the primary monitoring tool, and will be augmented by short term monitoring information. Monitoring plans should address rangeland standards including hydrologic, vegetative, and soil conditions.

Long-term and short-term monitoring attributes may include:

Hydrologic

- stream morphology; and
- streambank alteration.

Vegetative

- species composition;
- plant density;
- demographics;
- stubble height; and
- utilization.

Soils

- percent bare ground;
- compaction; and
- pedestaling.

Self-monitoring by permittee should be encouraged, but with these sideboards:

- permittee's data and BLM's data should be comparable;
- BLM must perform some level of compliance monitoring for each self monitored allotment to ensure the permittee's monitoring is being done and it is valid;

- there should be regular reporting of self-monitoring data; and
- when appropriate, monitoring should include the use of reference sites (such as exclosures).

Permittees and interested members of the public should be able to participate in the development of monitoring plans.

Butte GUIDELINE #4:

Compatible seasons and duration of use, rest periods, stocking rates, structural facilities, and management activities, should be designed and implemented to ensure that standards are achieved.

Butte GUIDELINE #5:

The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions, processes and native species of those sites.

Butte GUIDELINE #6:

Locate facilities (e.g., corrals, water developments) away from riparian areas and wetlands when possible.

Butte GUIDELINE #7:

Supplemental salt and minerals should not be placed adjacent to watering locations or in riparian-wetland

areas so not to adversely impact streambank stability, riparian vegetation, water quality, or other sensitive areas. Placement of salt in upland sites should consider critical winter wildlife habitat.

Butte GUIDELINE #8:

Noxious weed control is essential and should include: cooperative agreements, public education, and integrated pest management (mechanical, biological, chemical). Butte RAC has addressed weeds in a Resolution dated May 8, 1996 (attached).

Butte GUIDELINE #9:

Native species are preferred. Non-native species, where contributing to proper ecosystem function, are acceptable.

Butte GUIDELINE #10:

Livestock management should utilize Best Management Practices for livestock grazing that meet or exceed those approved by the State of Montana in order to maintain, restore or enhance water quality.

Butte GUIDELINE #11:

Grazing management practices should maintain or improve habitat for federally listed threatened, endangered, and sensitive plants and animals.

APPENDIX F – WILDLIFE

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THREATENED OR ENDANGERED SPECIES SCREENS

Grizzly bears, wolves, bald eagles, and lynx are the listed species that occur incidentally throughout the Butte Field Office. This appendix describes analysis screens developed by a Level 1 team of interagency field biologists to facilitate, streamline, and ensure consistency across administrative boundaries during Section 7 consultation under the Endangered Species Act.

The screens are designed to identify simple, straightforward actions that have insignificant or discountable effects on listed species. If proposed actions are fully compliant with the wildlife screens, and the screen leads to a "not likely to adversely affect" conclusion, they will likely be covered for terrestrial species by a programmatic concurrence from the U.S. Fish and Wildlife Service. These proposed actions could proceed once the appropriate documentation (i.e. biological assessment or worksheet with appropriate documentation) is completed. The screens are not all inclusive because some projects warrant additional analyses from the onset. Furthermore, even though an action is identified in the screen, the standard consultation procedure could still be required. A qualified wildlife biologist is responsible for implementing the screening process.

Wildlife screens are attached for bald eagle, gray wolf, and grizzly bear. Measures identified in the Lynx Conservation and Assessment Strategy (LCAS) will serve as the screen for lynx.

The Level 1 team is currently determining the appropriate format documentation procedure for the wildlife screening process. At a minimum, the action agency would be required to submit periodic progress reports for NLAA actions that have been consulted on using the programmatic concurrence.

The following sections provide guidance on how to use the wildlife screens and emphasize when the programmatic concurrence would not apply. If programmatic concurrence does not apply, the standard¹ section 7 process would occur. The process described here follows and compliments the National Fire Plan consultation strategy. The screens developed for the National Fire

Plan process consider the effects of certain fire-related projects and may be used to screen all National Fire Plan projects. The screens presented here consider the effects of most other activities.

CONDITIONS APPLICABLE TO ALL SCREENS

The programmatic concurrence applies to Forest Service and BLM projects or actions where the biological assessment clearly leads to a "not likely to adversely affect" (NLAA) determination. Use of the consultation screens is intended to be a tool to arriving at an effects determination; the biologist must consider the effects of the action added to the environmental baseline and cumulative effects. The concurrence is expressly limited to those simple, straightforward actions that will have documentation supporting insignificant or discountable effects on wildlife. **More complex projects that do not clearly lead to an NLAA determination or those projects for which the project biologist has any threatened and endangered wildlife species concerns do not qualify for this programmatic concurrence. For these projects, biologists should follow standard consultation processes.**

Further, projects not meeting or included in the species-specific criteria are not covered by the programmatic consultation and must follow the standard processes for conducting project analysis, biological assessment development, and consultation. Several activities are not included in the species' screens because the nature of the activity warrants additional consideration provided through standard consultation procedures.

If one species does not meet the screening criteria, then standard consultation procedures need to be followed for all species. However, it is possible to use the screens as a documentation process for those species that fit the screens and include this documentation alongside the analysis for the species that do not fit the screens.

As always, cumulative effects must be considered; cumulative effects findings may cause the project to go to standard consultation.

No Effect determinations are included in the species-specific flowcharts to assist in overall effect determinations even though consultation is not necessary.

Application of the screens and determination of project effects for compliance with Section 7 must be accomplished by a qualified wildlife biologist.

In no case does the programmatic concurrence apply to any project or action that has the potential to cause or increase the likelihood of take as defined by the Service's regulations.

In the event that a project or action proceeds under the programmatic concurrence and exceeds the conditions of the programmatic concurrence, the action agency must initiate informal or formal consultation or request reaf-

¹ Standard consultation refers to the process whereby the action agency biologist commences dialogue with U.S. Fish and Wildlife Service (Service) counterparts to determine the appropriate consultation procedures. Typically this involves phone correspondence to apprise the Service of the effects of an ongoing project and to reach consensus on such an effect and to determine if informal consultation is sufficient or if the project should proceed to formal consultation. Upon agreement of the respective consultation procedure, the action agency biologist will submit the appropriate request and documentation to the Service for concurrence or a biological opinion.

firmation of concurrence, as appropriate, for that project or action.

GRIZZLY BEAR PROJECT SCREENING ELEMENTS & DETERMINATIONS

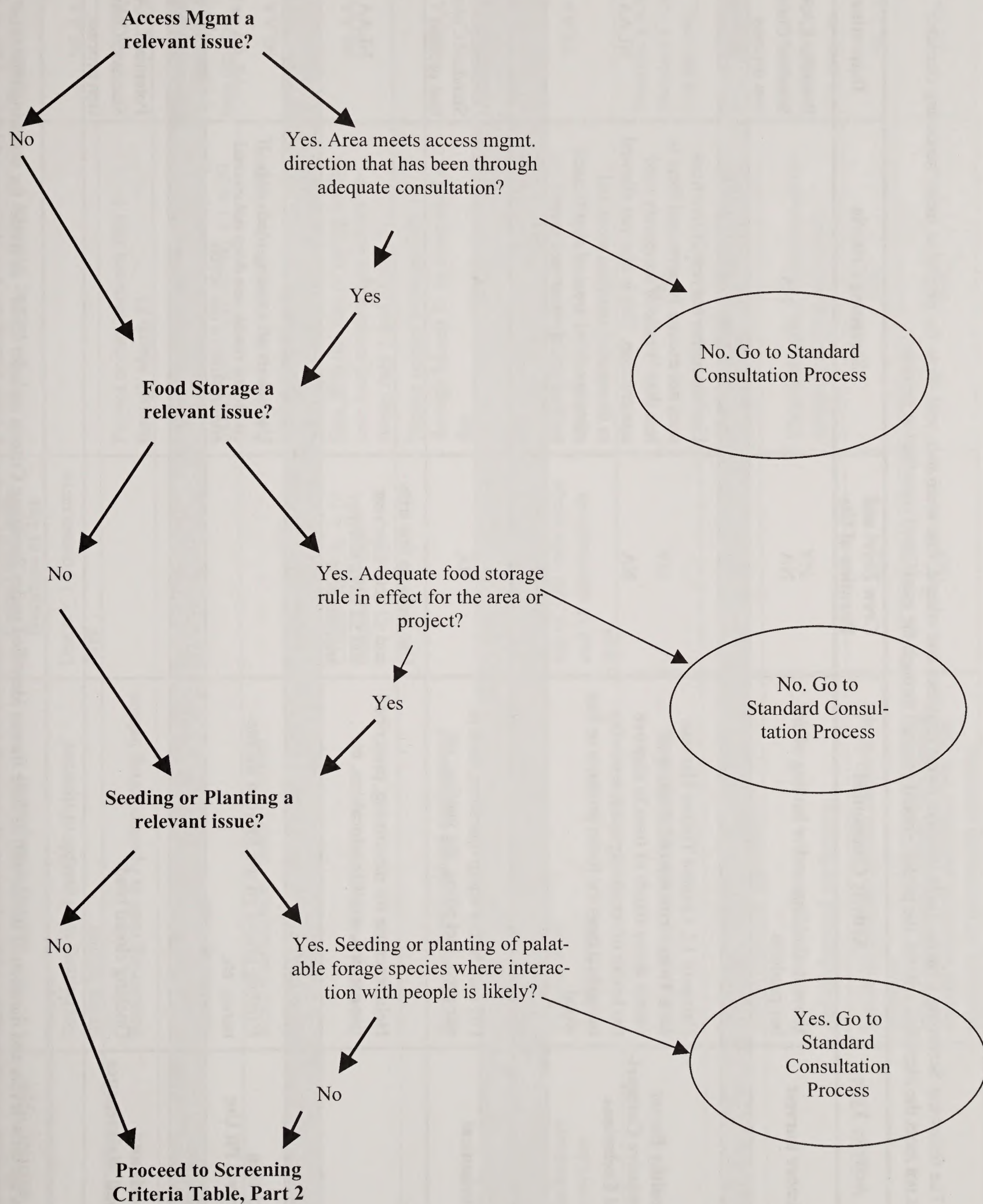
Three considerations are prerequisite to more detailed consideration of other project information and are considered in screening process Part 1. (1) The area must be in compliance with the appropriate access management direction. (2) Human foods, livestock feed, garbage, and other attractants must be managed by the application of an adequate² "food storage rule" similar to the NCDE or Yellowstone food storage orders. If no specific rule exists for the area, use of either the Yellowstone or NCDE order will be considered adequate. (3) Projects that involve seeding or planting of grasses, forbs, or shrubs, must do so in a manner that will tend not to attract bears into areas where increased mortality risk or interaction between bears and people is likely.

After access management, food/attractant storage, and seeding/planting of grasses, forbs, or shrubs has been considered in Part 1, only then can other project details be considered in the Screening Criteria Table, Part 2. Table 2 represents a comprehensive activity list. There may be activities that are not included in this Table. For those activities not included and for which there is an effect, follow standard consultation procedures. Also, the Not Likely to Adversely Affect (NLAA) determination reflects a conservative determination. There may be activities listed as NLAA in Table 2 that upon site-specific analyses warrant a No Effect determination.

Note: The scope of this programmatic biological assessment applies to areas where grizzly bears are expected to occur – not just within Recovery Zone boundaries.

²Food shall be attended or stored in a bear resistant manner. For examples of applicable methods of bear resistant storage and definitions for 'attended' review the NCDE or Yellowstone food storage orders.

GRIZZLY BEAR SCREENING PROCESS PART 1



Part 2: The following Screening Criteria Table displays forest activities and criteria, that when met, will allow the project to meet “screening elements”. If the project does not meet the identified criteria, the project should proceed through the established consultation process³.

#	Activity Type	Activity Component	Crew Level and Duration of Use	Screening Criteria	Determination
1	Timber harvest	Harvest, skidding, and/or hauling of timber products	NA	NA	Potential LAA, go to Standard Consultation process
2	Healthy Forest Initiative Categorical Exclusions	Category 12, Limited Timber Harvest: Live Trees – commercial thinning of overly dense stands of trees to improve the health of remaining trees; removing individual trees for forest products or fuel wood	NA	Limited timber harvest of live trees does not exceed 70 acres and there is less than ½ mile of temporary road construction. This is also not allowed in inventoried roadless areas and other specified areas of significance such as grizzly bear core areas.	NLAA
3	Mechanical	Off road heavy equip operation, such as site prep, fuel piling, log yarding, etc	NA	NA	Potential LAA, go to Standard Consultation process
		Helicopter use for monitoring, prescribed fire ignition, wildlife relocations, etc	Use includes few trips and ≤2 activities/year and ≤2 days/activity/analysis area	NA	NLAA
4	Existing Gravel Pit Use	Existing gravel pit use for road maintenance, etc.		Use occurs off existing roads only. If on closed roads, use does not exceed administrative use levels	NLAA or NE
5	Roads and Road Maintenance	Opening closed road			Potential LAA, go to Standard Consultation process.

³ References for crew levels and duration of use as well as time frames identified under Screening Criteria include: CEM – A model for assessing effects on grizzly bears, 1990; Response to peer review of the A19 and proposed approach to managing access in grizzly bear habitat, NCDE Technical Group 1/24/01; and Draft, Rationale and choices made in the review and development of an access direction proposal for the NCDE grizzly bear ecosystem, 11/24/98.

#	Activity Type	Activity Component	Crew Level and Duration of Use	Screening Criteria	Determination
		Reclaiming road outside of riparian/spring habitat	Use is ≤ 14 consecutive days		NLAA
		Reclaiming road in riparian/spring habitat		Project occurs between July 1 through March 31	NLAA
		Reclaiming road		Does not meet administrative use levels, or occurs in riparian/spring habitat and active during 4/1-6/30	Potential LAA, go to Standard Consultation process
		Road maintenance: blading, culvert cleaning, brushing, etc		Road is open, or use meets administrative use criteria	NLAA
		New road construction	Construction is ≤ 14 consecutive days	$\leq 1/2$ mile temporary road construction. If in riparian or spring habitat, new road construction occurs between July 1 and March 31	NLAA
		Bridge or stream culvert replacement		Project occurs between July 1 through March 31 or completed in ≤ 1 day	NLAA
6	Silviculture Activities	Reforestation hand planting	Day use only or camping of ≤ 20 individuals and ≤ 5 days/analysis area	Does not include snow plowing for access	NLAA
		Reforestation mechanical treatments	NA	NA	Potential LAA, go to Standard Consultation process.
		Insect suppression Aerial chemical application	NA	Chemicals do not effect cutworm moth or habitat	NLAA
		Insect suppression Aerial chemical application	NA	Chemicals affect cutworm moth or habitat, and in moth habitat	Potential LAA, go to Standard Consultation process
		Insect suppression ground chemical application	NA	NA	NLAA
		Insect suppression survey, fertilization, manual treatment, individual tree fire treatment, or pheromone treatment	NA	NA	NLAA

#	Activity Type	Activity Component	Crew Level and Duration of Use	Screening Criteria	Determination
		Precommercial thinning and long term (>1 year) commercial Christmas tree harvest			Potential LAA, go to Standard Consultation process
		Disease control – manual treatment of larch through girdling to control larch mistletoe	NA	NA	NLAA
7	Range	Infrastructure development	NA	NA	NLAA
		Grazing		Maintains or reduces existing livestock grazing or changes livestock class to a less vulnerable spp, and no history of depredation or control actions	NLAA
		Grazing		Increases livestock grazing, introduces new grazing into areas where depredation more likely, or history of livestock depredation	Potential LAA, go to Standard Consultation process
8	Recreation	Trail maintenance or reconstruction	NA	Results in increased use or change of user type	Potential LAA, go to Standard Consultation process
		Trail maintenance or reconstruction		Does not result in increase in use or change in user type	NLAA
		New Trail construction			Potential LAA, go to Standard Consultation process
		Facility operations, including developed and dispersed camping		Educate public campers and enforce sanitation standards. Does not increase use or change user type.	NLAA
				Sanitation standards are not enforced or use is increased or user type is changed.	Potential LAA, go to Standard Consultation process

#	Activity Type	Activity Component	Crew Level and Duration of Use	Screening Criteria	Determination
9	Forest Products	Personal use firewood collection, annual Christmas tree cutting, berry picking, low/incidental mushroom picking, and collection of "other forest products" (such as bear grass greens, medicinal herbs, pachistima, etc)		Does not include off road mechanical skidding or hauling. Include "bear aware" education message	NLAA
		Commercial firewood collection, berry picking, and "other forest products" (such as bear grass greens, medicinal herbs, pachistima, etc), but does not include mushrooms.	Day use only or camping of ≤20 individuals and ≤5 days total/analysis area	Does not include off road mechanical skidding or hauling. Enforce sanitation standards, and Include "bear aware" education message.	NLAA
10	Habitat Restoration	See timber harvest, mechanical treatments, roads, weed control, and prescribed fire. Also includes monitoring, fencing, fish barrier development, fish spp removal/trapping, rotenone treatment, interpretation/Con Ed, meadow restoration, riparian planting and restoration, snag creation, and water source development.	Day use only or camping of ≤20 individuals and ≤5 days/analysis area	Project occurs between July 1 through March 31 or completed in ≤1 day in riparian areas. Project does not result in an increase in public use or user type.	NLAA
11	Prescribed Fire	General support, ignition, mop-up	Day use only or camping of ≤20 individuals for ≤5 days/analysis area	Does not include riparian areas	NLAA
		Fire line construction	Same as support	Fire line does not/will not function as a road or trail and will be reclaimed after the fire.	NLAA
		Defensible space treatments (within 100m of structure) (Cohen 2000)	Same as support	Planting and/or seeding does not include palatable forage spp.	NLAA

#	Activity Type	Activity Component	Crew Level and Duration of Use	Screening Criteria	Determination
12	Watershed Restoration	Includes erosion control structures, sediment control, monitoring. Also, see reforestation, timber harvest, mechanical treatments, etc.	Day use only or camping of ≤20 individuals and ≤5 days/analysis area	Project occurs between July 1 through March 31 or completed in ≤1 day	NLAA
13	Weed Management	Chemical, aerial or ground application	NA	NA	NLAA
		Sheep or goat grazing	NA	NA	Potential LAA, go to Standard Consultation process
14	Non-recreational Special Uses	This includes maintenance of existing sites, corridors, or other facilities and is often carried out by the entity that owns the structures or facilities	NA	Meets administrative use levels	NLAA
		New construction of facilities – this includes microwaves, cell towers, substation communications, powerlines, etc.	NA	Construction of powerlines is ≤ ½ mile and includes vegetation clearing. Includes ≤ ½ mile of temporary road construction. Roads are not constructed in spring habitat between April 1 and June 30.	NLAA
15	Miscellaneous	Similar activity component, but must meet all screening criteria in parts 1 and 2 of the screens table and not violate any of these criteria.			NE or LNAA

CONSERVATION ACTIONS FOR GRIZZLY BEARS

The following excerpts from the Yellowstone Conservation Strategy and Grizzly Bear Management Plan for Southwestern Montana are pertinent to grizzly bear management in the Butte Field Office. These are the conservation measures that address the needs and risk factors for grizzly bear, and will be used to evaluate land management authorizations. The DFO is outside the Primary Conservation Area for grizzly, and only those actions specific to areas outside the PCA will be used.

Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area

March 2003

Chapter 1 Introduction and Background

The future management of the Yellowstone grizzly bear population is envisioned as one in which the grizzly and its habitat are conserved as integral parts of the Greater Yellowstone Area.

Within the Greater Yellowstone Area (GYA), the grizzly bear population and its habitat will be managed utilizing a management approach that identifies a Primary Conservation Area (PCA) and adjacent areas where occupancy by grizzly bears is anticipated and acceptable. The PCA is the existing Yellowstone grizzly bear recovery zone as identified in the 1993 *Grizzly Bear Recovery Plan (Recovery Plan)* (USFWS 1993). The size of the recovery zone is not being expanded in this approach. Upon implementation of this Conservation Strategy, management using a recovery zone line and grizzly bear Management Situations described in the Interagency Grizzly Bear Guidelines (IGBC 1986) will no longer be necessary¹. The PCA boundary will replace the recovery zone boundary.

In the Conservation Strategy, management direction is described for both the PCA and adjacent areas within the GYA. State grizzly bear management plans, forest plans, and other appropriate planning documents will provide specific management direction for the adjacent areas outside the PCA.

This Conservation Strategy was developed to be the document guiding management and monitoring of the Yellowstone grizzly bear population and its habitat upon recovery and delisting. This approach will remain in place beyond recovery and delisting. Ongoing review and evaluation of the effectiveness of this Conservation Strategy is the responsibility of the state and federal managers in the GYA. This Conservation Strategy will be updated by the management agencies every five years or as necessary, allowing public comment in the updating process.

Upon implementation of the Conservation Strategy, the Yellowstone Grizzly Coordinating Committee (YGCC) will replace the Yellowstone Ecosystem Subcommittee.

The Conservation Strategy and the State Management Plans

The purpose of this Conservation Strategy (Strategy) and the state plans is to:

- Describe and summarize the coordinated efforts to manage the grizzly bear population and its habitat to ensure continued conservation in the GYA
- Specify the population, habitat, and nuisance bear standards to maintain a recovered grizzly bear population for the foreseeable future
- Document the regulatory mechanisms and legal authorities, policies, management, and monitoring programs that exist to maintain the recovered grizzly bear population
- Document the commitment of the participating agencies

Implementation of the management strategies requires continued cooperation between federal and state agencies.

The GYA is a dynamic environment; monitoring systems in the Strategy allow for dynamic management as environmental issues change. The agencies are committed to be responsive to the needs of the grizzly bear by dynamic management actions based on the results of detailed annual population and habitat monitoring.

The vision of the Strategy can be summarized as follows:

- The PCA will be a secure area for grizzly bears, with population and habitat conditions maintained to ensure a recovered population is maintained for the foreseeable future and to allow bears to continue to expand outside the PCA.
- Outside of the PCA, grizzly bears will be allowed to expand into biologically suitable and socially acceptable areas.
- Outside of the PCA, the objective is to maintain existing resource management and recreational uses and to allow agencies to respond to demonstrated problems with appropriate management actions.
- Outside of the PCA, the key to successful management of grizzly bears lies in bears utilizing lands that are not managed solely for bears but in which their needs are considered along with other uses.
- Expand public information and education efforts.
- Provide quick responsive management to deal with grizzly bear conflicts.
- Manage grizzly bears as a game animal; including allowing regulated hunting when and where appropriate.

Relationship to Other Plans

By integrating state plans into the Strategy, it was ensured that the plans and the Strategy are consistent where necessary and complementary. The state plans are formally incorporated in the Conservation Strategy as Appendices K, L, and M.

Relationships with national forest and national park plans are also mentioned throughout the Strategy. Land and resource management plans for some national forests, national parks, and the Bureau of Land Management (BLM) in the GYA have incorporated the habitat standards and other relevant provisions of the Conservation Strategy. For those standards and provisions not yet incorporated into management plans, the agencies will implement the habitat standards and monitoring requirements in this conservation strategy through their established planning processes, subject to NEPA or other legal requirements.

Chapter 2 Population Standards and Monitoring

To maintain a healthy (recovered) grizzly bear population in the GYA, it is necessary to have adequate numbers of bears that are widely distributed with a balance between reproduction and mortality. This section details the population criteria in the *Recovery Plan* that were necessary to achieve recovery, and the population standards necessary to maintain it. *Recovery Plan* criteria focus on the PCA and a 10-mile perimeter, whereas standards in the Strategy and the parameters in appended state plans focus beyond the PCA and encompass the entire GYA. Because grizzly bears are a difficult species to monitor and manage, multiple standards with additional monitoring items are identified to provide sufficient information upon which to base management decisions. It is the goal of the agencies implementing this Conservation Strategy to manage the Yellowstone grizzly population in the entire GYA at or above a total of 500 grizzly bears.

Chapter 3 Habitat Standards and Monitoring

The habitat standards identified in this document will be maintained at identified levels inside the PCA. In addition to the habitat standards, several other habitat factors will be monitored and evaluated to determine the overall condition of habitat for bears. It is the goal of the habitat management agencies to maintain or improve habitat conditions existing as of 1998, as measured within each subunit within the PCA, while maintaining options for management of resource activities at approximately the same level as existed in 1998. The habitat standards in this document are subject to revision based on the best available science and will be reviewed and updated as necessary.

Habitat standards include:

- Maintenance of secure habitat at 1998 levels in each BMU subunit through management of motorized access route building and density, with short-term deviations

allowed under specific conditions. Secure habitat is defined as more than 500 meters from an open or gated motorized access route or reoccurring helicopter flight line and must be greater than or equal to 10 acres in size.

- The number of commercial livestock allotments and number of permitted domestic sheep will not exceed 1998 levels inside the PCA. Existing sheep allotments will be phased out as the opportunity arises with willing permittees.
- Management of developed sites at 1998 levels within each BMU subunit, with some exceptions for administrative and maintenance needs

Habitat criteria that will be monitored and reported include:

- Monitoring open and total motorized access route density in each BMU subunit inside the PCA
- Monitoring of four major food items throughout the Yellowstone area: winter ungulate carcasses, cutthroat trout spawning numbers, bear use of army cutworm moth sites, and whitebark pine cone production. The incidence of white pine blister rust in sampled areas will also be monitored.
- Monitoring of habitat effectiveness in the PCA using the databases from the Yellowstone Grizzly Bear Cumulative Effects Model
- Monitoring the number of elk hunters inside the PCA
- Monitoring the number of grizzly bear mortalities throughout the Yellowstone area on private lands and development of a protocol to monitor private land status and condition
- Land managers will ensure that habitat connectivity is addressed throughout the Yellowstone area as part of any new road construction or reconstruction

Chapter 4 Management and Monitoring of Grizzly Bear/Human Conflicts

The management of grizzly bear/human conflicts inside the PCA is based upon the existing laws and authorities of the state wildlife agencies and federal land management agencies. Outside the PCA, state management plans will direct the management of nuisance bears. Management of nuisance bears usually falls into one or more of the following categories:

- Removing or securing the attractant
- Deterring the bear from the site through the use of aversive conditioning techniques
- Capturing and relocating the nuisance bear
- Removing the bear from the wild, including lethal control

The focus and intent of nuisance grizzly bear management inside and outside the PCA will be predicated on strategies and actions to prevent grizzly bear/human

conflicts. It is recognized that active management aimed at individual nuisance bears will be required in both areas. Management actions outside the PCA will be implemented according to state management plans. These actions will be compatible with grizzly bear population management objectives for each state for the areas outside the PCA.

In circumstances that result in a nuisance bear situation outside the PCA, more consideration will be given to existing human uses. Site-specific conflict areas within and outside the PCA will be documented and prioritized to focus proactive management actions to minimize grizzly bear/human conflicts and address existing and potential human activities that may cause future conflicts. Past conflict management has demonstrated that grizzly bears can coexist with most human activities.

Management of all nuisance bear situations will emphasize resolving the human cause of the conflict. Relocation and removal of grizzly bears may occur if other management actions are not successful.

Before any removal, except in cases of human safety, management authorities will consult with each other prior to judging the adequacy of the reason for removal.

Captured grizzly bears identified for removal may be given to public research institutions or public zoological parks for appropriate non-release educational or scientific purposes as per regulations of states and national parks. Grizzly bears not suitable for release, research, or educational purposes will be removed as described in appropriate state management plans or in compliance with national park management plans.

All grizzly bear relocations and removals will be documented and reported annually in the IGBST (Interagency Grizzly Bear Study Team) Annual Report.

Chapter 5 Information and Education

The purposes of the information and education aspects of this cooperative effort are to support the development, implementation, and dissemination of a coordinated information and education program. This program should be understandable and useful for the people who visit, live, work, and recreate in bear habitat to minimize grizzly bear/human conflicts and to provide for the safety of people while building support for viable bear populations.

Information made available to the public will be open and responsive to public concerns. Open discussions with the public will increase credibility of the grizzly bear management program.

These efforts will be reviewed periodically and program adjustments will be made as necessary. In addition, efforts will be expanded as the bear population expands and additional efforts will be needed in areas that could become occupied in the near future.

The current information and education (I & E) working group within the Greater Yellowstone Area will continue. Members of this I & E team include public affairs personnel from Forest Service Regions 1, 2, and 4; Grand Teton and Yellowstone National Parks; the BLM; representatives from each state wildlife agency; and the information and education specialist from the IGBC. This team will continue to work with all affected interests to ensure consistency of information, efficient funding strategies, identifying and targeting audiences, developing partnerships, and identifying new tools for implementation.

Grizzly Bear Management Plan for Southwestern Montana

2002-2012

Specific Habitat Management and Guidelines

FWP will seek to maintain road densities of 1 mile or less per square mile of habitat as the preferred approach. This is the goal of the statewide elk management plan (including the southwestern Montana areas covered by this plan). The goal seeks to meet the needs of a variety of wildlife while maintaining reasonable public access. If additional management is needed based on knowledge gained as bears reoccupy areas, it should be developed and implemented by local groups as suggested in this plan.

The following general management guidelines are applicable coordination measures. They should be considered when evaluating the effects of existing and proposed human activities in identified seasonally important habitats for a variety of wildlife species including grizzlies on federal and State lands.

1. Identify and evaluate, for each project proposal, the cumulative effects of all activities, including existing uses and other planned projects. Potential site-specific effects of the project being analyzed are a part of the cumulative effects evaluation which will apply to all lands within a designated "biological unit". A biological unit is an area of land which is ecologically similar and includes all of the year-long habitat requirements for a sub-population of one or more selected wildlife species.
2. Avoid human activities, or combinations of activities, on seasonally important wildlife habitats that may result in an adverse impact on the species or reduce long-term habitat effectiveness.
3. Base road construction proposals on a completed transportation plan which considers important wildlife habitat components and seasonal use areas in relation to road location, construction period, road standards, seasons of heavy vehicle use, road management requirements, and more.
4. Use minimum road and site construction specifications based on projected transportation needs.

Schedule construction times to avoid seasonal-use periods for wildlife as designated in species-specific guidelines.

5. Locate roads, drill sites, landing zones, etc., to avoid important wildlife habitat components based on site-specific evaluation.
6. Roads that are not compatible with area management objectives, and are no longer needed for the purpose, for which they were built, will be closed and reclaimed. Native plant species will be used whenever possible to provide proper watershed protection on disturbed areas. Wildlife forage and/or cover species will be used in rehabilitation projects where appropriate.
7. Impose seasonal closures and/or vehicle restrictions based on wildlife, or other resource needs, on roads that remain open and enforce and prosecute illegal use by off-road vehicles if given authority. FWP will actively work to secure authority through the appropriate process and identify funding to support enforcement efforts.
8. FWP supports the U.S. Forest Service and BLM restrictions banning all off-road/trail use.
9. Efforts will be directed towards improving the quality of habitat in site-specific areas of habitually high human-caused bear mortality. Increased sanitation measures, seasonal road closures, etc., could be applied.

BALD EAGLE PROJECT SCREENING ELEMENTS & DETERMINATIONS

All attempts were made to adhere to and be compatible with the guidance found in the Montana Bald Eagle Management Plan (July 1994). Please refer to the Montana Bald Eagle Management Plan for further, more detailed, information. For a proposed activity in or near bald eagle breeding habitat, take it through each of the screens that refer to the location in which the project will occur (e.g. Zone I, etc.). Read each separate section if it is within the area of zone affected. Note, the Not Likely to Adversely Affect (NLAA) determinations reflect a conservative determination. There may be activities listed as NLAA that upon site specific analyses warrant a No Effect determination.

Definitions:

Zone I - Nest Site Area, ¼ mi (400 m) radius of all nest sites in the breeding area that have been active within 5 years or until an active nest is located. When an active nest is located, Zone I applies only to the active nest (MBEMP p.23). Zone maps may be modified if sufficient information on bald eagle use of the area exists.

Zone II - Primary Use Area, includes the area ¼ mi (400 m) to ½ mi (800 m) from all nest sites in the breeding area that have been active within 5 years or until an active nest is located. When an active nest is located, Zone II applies only to the active nest (*Id.*p.23).

Zone III - Home Range, represents most of a home range used by eagles during the nesting season. It usually includes all suitable foraging habitat within 2.5 mi (4 km) of all nest sites in the breeding area that have been active within 5 years (*Id.* p.24).

Foraging Habitat - Includes foraging habitat outside of Zones I, II and III where resident breeding birds may forage. This is essential for the entire population, not just resident breeding eagles. This includes lakes, rivers, wetlands and meadows (*Id.* p.24).

Human Activity - Examples of low intensity such as dispersed recreation; high intensity is heavy equipment use, blasting, logging, or concentrated recreation (*Id.* p.24).

Development - Development that may increase human activity levels or negatively impact bald eagle habitat (*Id.* p. 24 refers to permanent development)

Nesting Season (dates) - As early as Feb. 1 and as late as Aug. 15 in MT (*Id.* p.22); nest specific information will firm up the dates for that nest/pair.

Postfledging - Birds leave the nest area, generally in Aug. in MT

Habitat alteration - That which may negatively affect bald eagles include, but are not limited to, timber harvest, prescribed fire, power line construction, pesticide use, land clearing, stream channeling, levee or dam construction or wetland drainage (*Id.*p.23).

Nesting and feeding habitat characteristics - See MBEMP p. 27-28

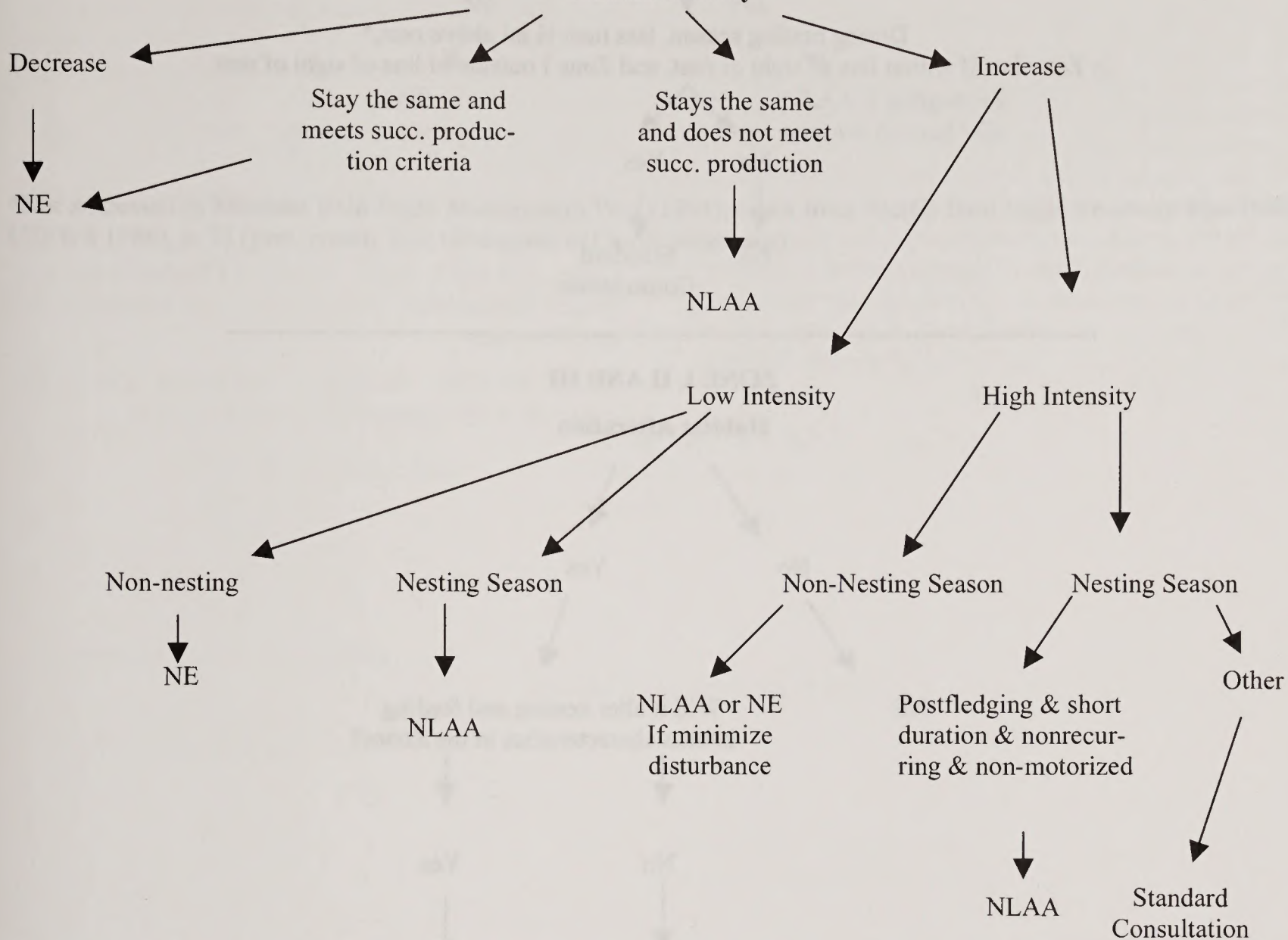
Structures - Example of a structure hazardous to bald eagles is overhead utility lines (*Id.* p.24)

Disturbance - Any human elicited response that induces a behavioral or physiological change in a bald eagle contradictory to those that facilitate survival and reproduction. Disturbance may include elevated heart or respiratory rate, flushing from a perch or events that cause a bald eagle to avoid an area or nest site (*Id.* p. 48).

Key use areas - Parts of Zone III most used by bald eagles

Successful Production Criteria - 60% nest success and has fledged 3 or more young during the preceding 5 years (*Id.* p. 23)

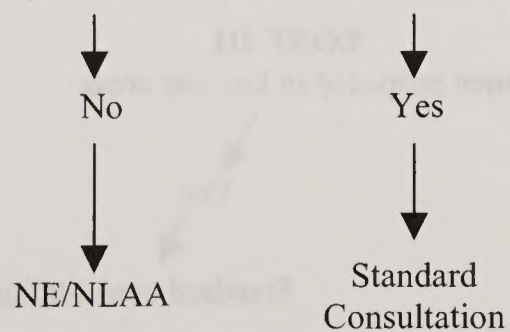
ZONE I AND II Human Activity



ZONE I AND II

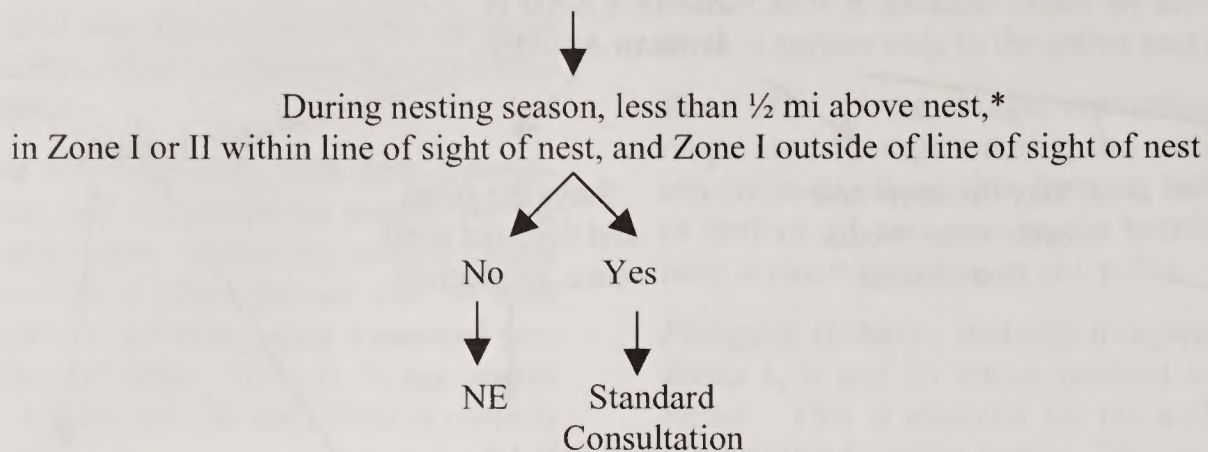
Permanent Development

(Also see Habitat Alteration below)

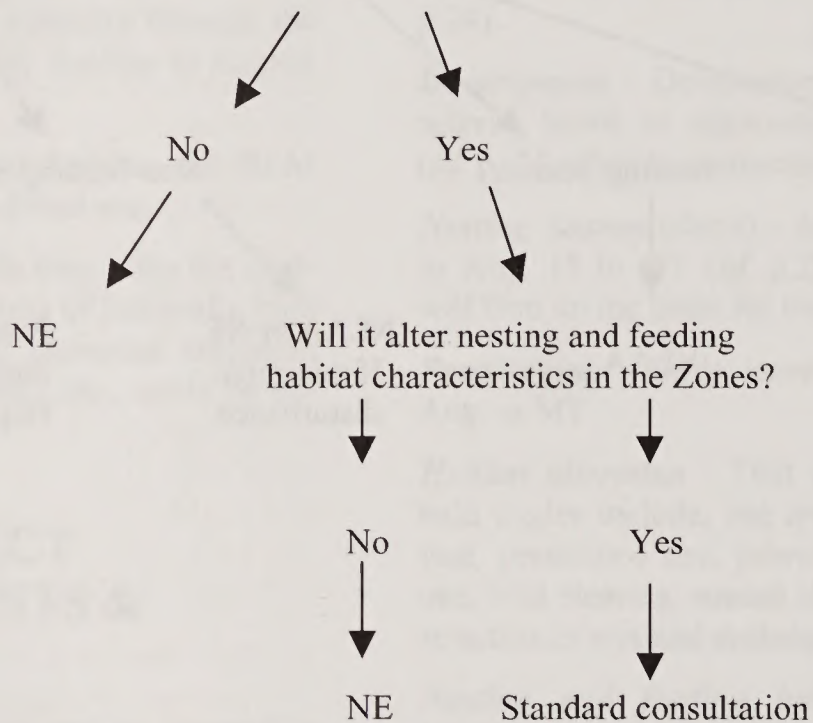


ZONE I AND II*

Repeated flights by helicopter, light plane, hang glider, paraglider, parachute, or hot air balloon under the control of an agency (permitted, etc.)

**ZONE I, II AND III**

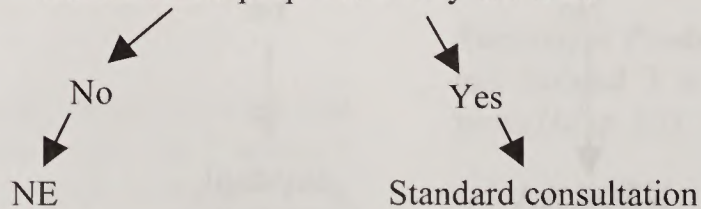
Habitat Alteration

**ZONE II AND III AND FORAGING AREAS**

Structures proposed that pose no risk to bald eagles or their prey

**ZONE III**

Disturbance proposed in key use areas



FORAGING HABITAT

Will the **project** increase road kills?

No

Yes

NE

NLAA if mitigate by
removal of road kills

*Not addressed in Montana Bald Eagle Management Plan (1994); taken from Pacific Bald Eagle Recovery Plan (USDI USFWS 1986), p. 53 (pers. comm. Eric Greenquist to Carole Jorgensen)

WOLF PROJECT SCREENING ELEMENTS & DETERMINATIONS

The following screening process is intended to facilitate ESA processing of project consultation requirements. The wolf screen should be used to assist you in identifying projects that have "no effect" (NE) or "*not likely to adversely affect*" (NLAA) determination calls for the wolf. All projects that do not fall into the NE or NLAA must consider effects on wolves by using the standard consultation process for evaluating impacts of proposed projects on threatened and endangered species. Also, the Not Likely to Adversely Affect (NLAA) determinations reflect a conservative determination. There may be activities listed as NLAA that upon site specific analyses warrant a No Effect determination.

The major components of the wolf screen are population designation (wild or experimental) and whether the proposed project has any relationship to den or rendezvous sites during spring/summer, the prey base and/or livestock grazing. The wolf screen was based on personal communications, review by the Montana Level I Team and the following references:

USDI. 1987. Wolf Recovery Plan.

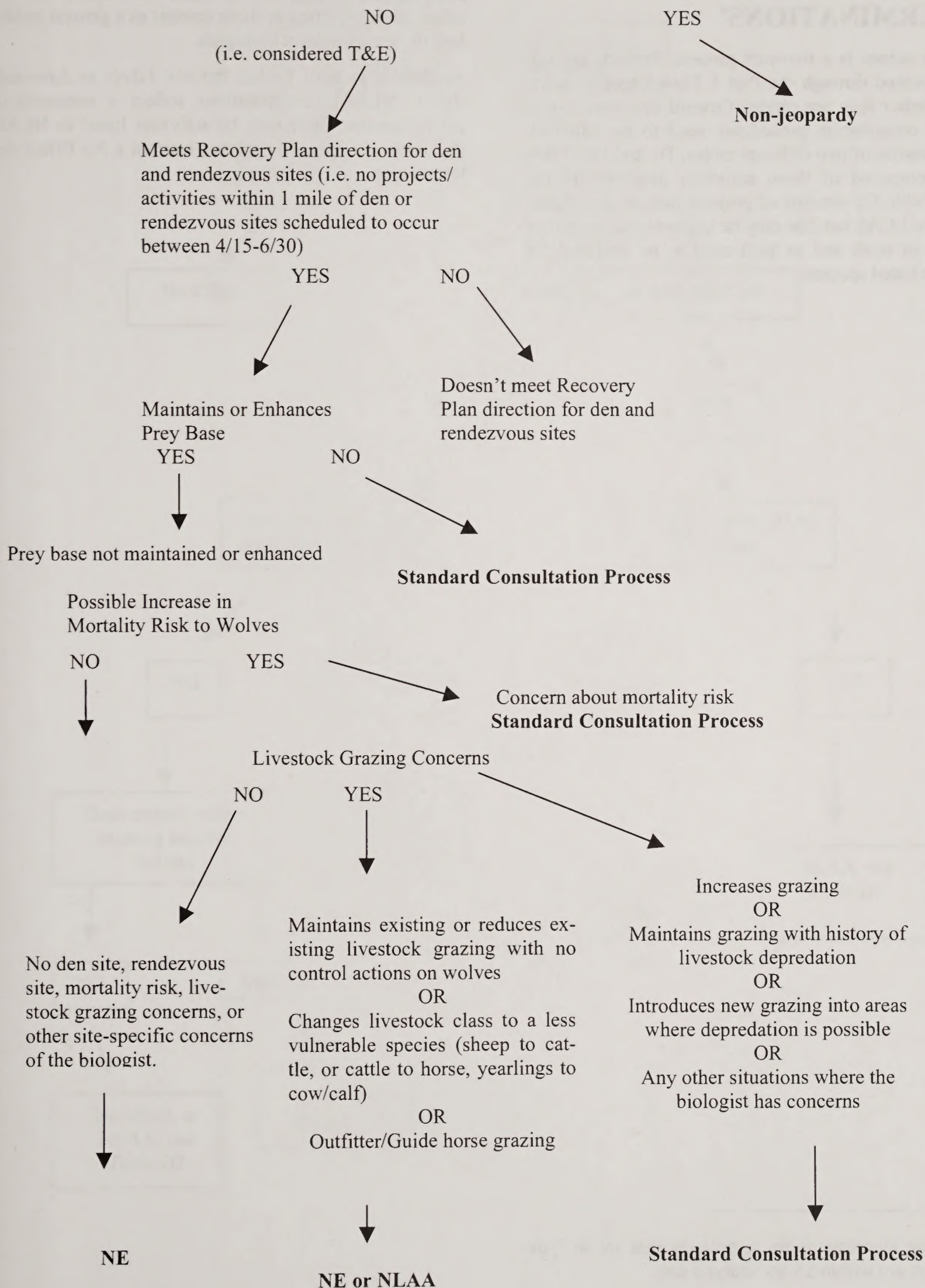
Fontaine, Joe. Personal communication (with Mike Hillis)

USDA and USDI. 2000. Interior Columbia Basin Ecosystem Management Project, Final Environmental Impact Statement.

USDA and USDI. Biological Assessment. Interior Columbia Basin Ecosystem Management Project.

EXPERIMENTAL POPULATION

[(10(j))]



LYNX PROJECT SCREENING ELEMENTS & DETERMINATIONS⁴

The lynx screen is a two-part process. Projects are initially screened through the Part 1 Flow Chart to determine whether they are carried forward into Part 2 or if standard consultation procedures need to be followed. Part 2 consists of two different tables, D1 and D2. Table D1 is composed of those activities described in the LCAS. Table D2 consists of projects that are not identified in the LCAS but that may be implemented as part of program of work and as such need to be analyzed for effects to listed species.

Table D2 is based on the consultation that was completed when the lynx was listed in 2000 and through ongoing project analysis. As such, we retained the "no effect" determination in these screens as a general guideline for use by project biologists.

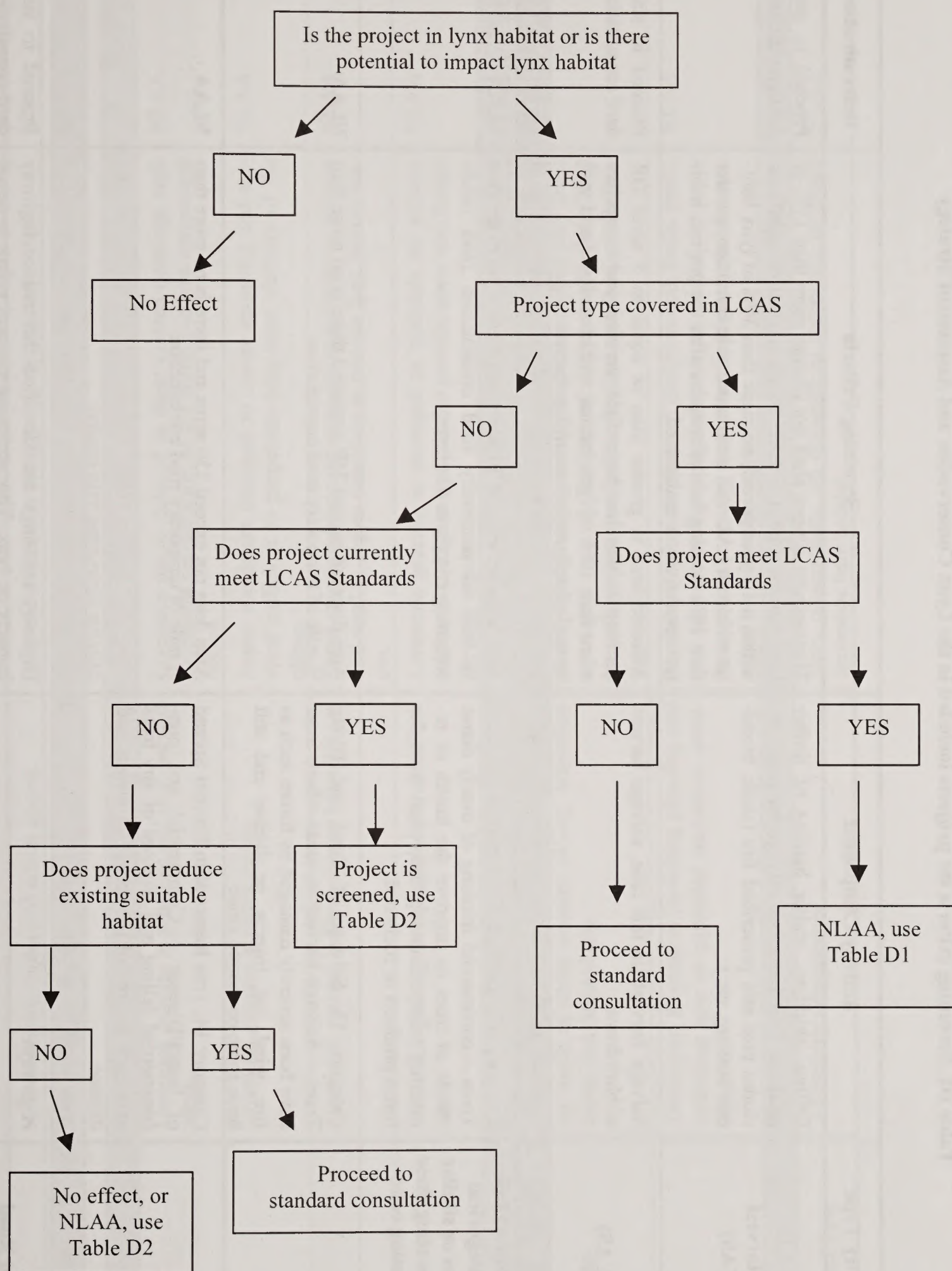
Applicable to both Tables, the *Not Likely to Adversely Affect* (NLAA) determinations reflect a conservative determination. There may be activities listed as NLAA that upon site specific analyses warrant a No Effect determination.

⁴ Screening elements apply to projects that are in lynx habitat that are within a lynx analysis unit.

Refer to the Lynx Conservation Assessment and Strategy for a definition of lynx habitat

LYNX SCREENS

PART 1



LYNX SCREENS, PART 2 (Tables D1 and D2)

Table D1. Screening criteria for projects included in the Lynx Conservation and Assessment Strategy

#	Activity Type	Activity Component	Screening Criteria	Determination
1	Timber Harvest (from LCAS)	Felling, skidding, and/or hauling of timber products (not including salvage harvest). Includes post sale prescribed fire (slash, broadcast burning, etc.)	Management actions shall not change more than 15% of lynx habitat within a LAU to an unsuitable condition within a 10-year period; no more than 30% of lynx habitat within an LAU will be in unsuitable condition; greater than 10% denning habitat remains after the project; habitat connectivity is maintained	Proceed to standard consultation
	(From LCAS)	Salvage harvest (in this case, salvage harvest of blowdown)	Affected area is greater than or equal to 5 acres OR denning habitat has been field verified and comprises more than 10% of lynx habitat within an LAU and will be well-distributed after salvage harvest	Proceed to standard consultation
2	Healthy Forest Initiative Categorical Exclusions or similar project meeting these and screening criteria in #1	Category 12, Limited Timber Harvest: Live Trees – commercial thinning of overly dense stands of trees to improve the health of remaining trees; removing individual trees for forest products or fuelwood	Area does not exceed 70 acres and there is no more than 1/2 mile of temporary road construction (and meets screening criteria in #1 above)	NLAA
		Category 13, Salvage of Dead and Dying Trees – Salvage harvest in areas where trees have been severely damaged by forces such as fire, wind, ice, insects, or disease and still have some economic value	Area does not exceed 250 acres and there is no more than 1/2 mile of temporary road construction	NLAA
		Category 14, Tree Removal to Prevent Spread of Insect/Disease – Commercial and non-commercial felling and removal of any trees necessary to control the spread of insects and disease	Area does not exceed 250 acres and there is no more than 1/2 mile of temporary road construction	NLAA
3	Roads and Road Maintenance	Highways	Highway crossings are identified that reduce highway impacts on lynx. This screening element refers to actual projects that involve the creation of highway crossings to facilitate lynx movement.	Proceed to standard consultation

#	Activity Type	Activity Component	Screening Criteria	Determination
		Non-recreation motorized winter access	Over-snow access is restricted to designated routes	NLAA
4	Silviculture Activities	Precommercial thinning	Precommercial thinning occurs in stands that no longer provide snowshoe hare habitat	NLAA
5	Range	Livestock grazing in post-fire and post-harvest areas	Livestock use is delayed in these created openings until successful regeneration of the shrub and tree component occurs	NLAA
		Livestock grazing in aspen stands	Aspen stands are managed to ensure sprouting and survival sufficient to perpetuate long-term viability of the clones	NLAA
		Livestock grazing in shrub-steppe habitats	Shrub-steppe habitats are managed to maintain or achieve mid-seral or higher condition to provide lynx habitat matrix	NLAA
		Livestock grazing in riparian areas or willow carrs	Livestock grazing is managed to maintain or achieve mid-seral or higher condition to provide cover and forage for prey species	NLAA
6	Recreation	Snowmobiling and other over-the-snow activity such as cross country skiing, snowshoe races, and dogsledding	No net increase in groomed or designated over-the-snow routes for any winter activity and snowmobile play areas by LAU (see definition of 'designated' 5/19/2002 McAllister letter with Clarification and Revised Definitions, p.2)	NLAA
		Developed Recreation including planning and operating new or expanded recreation developments	Landscape connectivity is not compromised; trails, roads, and lift termini are designed to direct winter use away from diurnal security areas; key linkage areas are provided for landscape connectivity	NLAA
7	Prescribed Fire	All activity components	Burn prescriptions are designed to regenerate or create snowshoe hare habitat	NLAA

Table D2. Screening criteria for projects not included in the Lynx Conservation and Assessment Strategy

#	Activity Type	Activity Component	Screening Criteria	Determination
1	Roads and Road Maintenance	Road Maintenance - This includes general road maintenance that may involve the brushing of vegetation on the road or along roadsides. Road maintenance may include but is not limited to roadbed blading, brushing, cleaning ditches, replacing or cleaning culverts, cleaning dips, or spot graveling.	Brushing included	NLAA
		Road Decommissioning - This involves the use of heavy equipment and includes obliteration and other methods to hydrologically neutralize the road.	No brushing associated with activity	NE
		General Road Use - This includes hauling timber, removing mining waste and materials, and moving livestock over federal roads for which permits are required. It also includes routine road use by administrative units to carry out work associated with recreation, range, timber and minerals management, fire prevention and suppression, inventories, surveys, and other monitoring activities. This includes use of roads consistent with existing travel plans.	Activity includes right-of-ways, multiple dwelling construction, or development of large corporate lands	Proceed to Standard Consultation
2	Silvicultural Activities		Activity occurs in winter and does NOT include right-of-ways, multiple dwelling construction, or development of large corporate lands	NLAA
		Tree planting	Activity occurs in spring, summer, or fall and does NOT include right-of-ways, multiple dwelling construction, or development of large corporate lands	NE
		Disease control – manual treatment of larch through girdling to control larch mistletoe	Tree planting does not result in stand type conversion. Activity does not involve snowplowing	NE
3	Recreation		Activity does not involve snowplowing	NLAA
		Recreation Special Uses - This includes activities for which permits are issued and includes outfitting and permits issued to a variety of organizations that engage in activities such as mountaineering, rock climbing, outward bound, ski races, concerts, "Poker Runs", "Fun Runs", driving tours, nature watch hikes, hunting, fishing, and a wide variety of other events.	Activity is consistent with existing access management from Forest and Travel Plans and is consistent with the LCAS	NE
			Activity occurs in Spring, Summer, Fall	NE
			Activity involves hunting mountain lions with dogs	NLAA
			Activity occurs in winter	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
		Trail Use consistent with existing travel management	Activity occurs in winter, meets LCAS	NLAA
		Maintenance and/or Minor Trail Re-routes - This consists of maintenance of trails and minor trail re-routes and may require use of heavy equipment.	Activity occurs in spring, summer, or fall	NE
		New Trail Construction and/or Major Trail Re-routes and Maintenance - This includes the development of new trails used for foot, stock, or motorcycles and may require the use of heavy equipment or hand tools and may create a clearing width up to 10 feet wide (FSH 2309.18). This also includes major re-routing and may require use of heavy equipment and/or blasting.	Activity does not involve blasting	NE
		Camping - Includes dispersed and developed campgrounds	Consistent with existing travel plans and LCAS and occurs during spring, summer, or fall	NLAA
		Dispersed off-road activities	Consistent with existing travel plans and LCAS	NE
		Permitted and Non-permitted use of Developed Sites, Facilities, and Their Maintenance - This includes special use permits issued for facilities, residences, and other structures. Permits are also issued for organizational camps such as the Boy Scouts and church groups at developed campgrounds. Other facilities include but are not limited to campgrounds, rental cabins, watchable wildlife sites, picnic areas, warming huts, and communication sites. Also includes Forest Service administrative sites and their maintenance (e.g. campgrounds, trailheads, ranger stations, etc.)	Activity occurs or is associated with ski areas	Proceed to Standard Consultation
			Activity occurs during the winter	NLAA
			Activity occurs during spring, summer, or fall	NE
4	Forest Products	Post and Pole Sales - This includes both commercial and non-commercial post and pole sales. This typically occurs in forested stands consisting of trees 5-9" diameter at breast height (dbh).	LCAS habitat criteria are met within the respective LAU (i.e. activity occurs in dense stands where low live limbs are generally out of reach for snowshoe hare).	NLAA

#	Activity Type	Activity Component	Screening Criteria	Determination
		Firewood Collection - This includes both commercial and non-commercial collection and involves the collection of standing dead or down wood.	LCAS habitat criteria are met within the respective LAU	NLAA
		Other Forest Products - This includes but is not limited to berry, mushroom, and bear grass collection and includes both commercial and non-commercial activities. Collection of tree products is not included.	LCAS habitat criteria are met within the respective LAU	NE
		Christmas Tree/Bough Cutting - This includes both commercial and non-commercial cutting. The trees cut range from 3" to 5" dbh and are less than 25' tall.	LCAS habitat criteria are met within the respective LAU. Stand must not be converted to unsuitable snow-shoe hare habitat. See Lynx Conservation Assessment and Strategy for a definition of 'unsuitable' habitat.	NLAA
5	Habitat Restoration	Forest and Shrub/Grassland Habitat Management - This includes aspen rejuvenation, shrub field maintenance and other types of ecosystem 'driven' projects designed to promote natural processes in an area.	LCAS habitat criteria are met within the respective LAU	NLAA
6	Noxious Weed Management	This includes chemical and biological treatments to noxious weeds within or adjacent to lynx habitat	Activity includes aerial application Activity includes only ground application (no aerial application)	NLAA NE
7	Other Special Uses	This includes maintenance of existing sites, corridors, or other facilities and is often carried out by the entity that owns the structures or facilities. Maintenance may include vegetation blading or cutting, or spraying to reduce brush and reduce the invasion of shrubs and trees among other activities.		NLAA
8	Mining and Gravel Pits	Quarries, recreational mining, small mines, and reclamation of small mines	Mines and gravel pits <5 acres, no winter time operation	NLAA or NE

#	Activity Type	Activity Component	Screening Criteria	Determination
9	Ditches and Diversions			NE
10	Surveys	Surveys – This includes snow course surveys, track counts, habitat sampling, hair posts, remote camera stations, and radio telemetry among other methods.	Operations are during winter and include repeated snow compaction activities(cross country ski trips, snowmobile trips) on ungroomed trails generally not being used by public	NLAA
			Operations are during spring, summer, or fall	NE
11	Miscellaneous	Similar activity component, but must meet all screening criteria in parts 1 and 2 of the screens table and not violate any of these criteria		NE or LNAA

CONSULTATION SUMMARY SHEET FOR PROGRAMMATIC ASSESSMENT

CONSULTATION SUMMARY SHEET INSTRUCTIONS FOR PROGRAMMATIC BIOLOGICAL ASSESSMENT

Summary sheets will be filled out by Project Biologists and reviewed by Forest Biologists. Project Biologists will submit summary sheets to Forest Biologists on a project-by-project basis. Forest Biologists will submit summary sheets, with one project per sheet, to the U.S. Fish and Wildlife Service quarterly and, as needed, these projects will be reviewed and discussed by the Level One Team to ensure the screening criteria are adequately interpreted and applied. There will be a random audit of a few projects each year to insure compliance and effectiveness of the screens and reporting requirements.

Page ____ of ____

Administrative Unit: _____

Contact: Project Biologist

Reviewed by: Forest Biologist

Date: _____

Project Name and Description	Species	Effects of Action	Cumulative Effects (ESA)	How does the project meet screening criteria?	Determination of Effects
Project description should provide pertinent information including all aspects of the project that potentially affect T&E species. This includes but is not limited to: project name, project location including management unit if applicable, timing of implementation and details of project activities.	Grizzly Bear	Briefly describe the overall effect for the entire project on the species and base it on the screening criteria.	Briefly describe the effects of future, non-federal actions that are reasonably likely to occur in the action area (this is the area where the effects of the project may be felt).	Specifically identify the screening criteria and describe how the project meets these specific criteria.	<ul style="list-style-type: none">No EffectMay affect not likely to adversely affect
	Gray Wolf				
	Bald Eagle				
	Canada Lynx				

CONSULTATION SUMMARY SHEET FOR PROGRAMMATIC BIOLOGICAL ASSESSMENT

Page ____ of ____

Administrative Unit: _____

Contact: _____

Reviewed by: _____

Date: _____

Project Name and Description	Species	Effects of Action	Cumulative Effects (ESA)	How does the project meet screening criteria?	Determination of Effects
	Grizzly Bear				
	Gray Wolf				
	Bald Eagle				
	Lynx				

LYNX CONSERVATION ASSESSMENT AND STRATEGY (LCAS) SUMMARY AND LYNX CONSERVATION MEASURES

The BLM and FWS signed a Conservation Agreement to promote the conservation of the Canada lynx and its habitat on BLM lands, using the Lynx Science Report and the Lynx Conservation and Assessment Strategy. The LCAS was developed in place of the normal recovery plan previously used for most other species listed under ESA.

The agreement and strategy identify objectives, standards, guidelines, and conservation measures to reduce or eliminate risk factors. These measures are intended to conserve the lynx, and to reduce or eliminate adverse effects from the spectrum of management activities on federal lands. These measures are provided to assist federal agencies in seeking opportunities to benefit lynx and to help avoid negative impacts through the thoughtful planning of activities. Plans that incorporate them, and projects that implement them, are generally not expected to have adverse effects on lynx, and implementation of these measures across the range of the lynx is expected to lead to conservation of the species.

Critical habitat for the Canada Lynx was not designated through the listing process. The LCAS instead relies on defining potential habitat based on vegetation characteristics and prey availability wherever that may occur since current lynx populations are small and widely dispersed. Conservation focus is to:

- Manage forested habitat within the historic range of variability for vegetation, and maintain large unfragmented blocks of forest with the appropriate structure;
- Maintain dense understory conditions providing cover and forage for snowshoe hares as the primary lynx prey base;
- Minimize snow compaction that would encourage access for competing predators into lynx habitat; and
- Provide connections within and between lynx habitat areas, emphasizing riparian habitats.

CONSERVATION MEASURES APPLICABLE TO ALL PROGRAMS AND ACTIVITIES

Because it is impossible to provide standards and guidelines to address all possible actions in all locations across the broad range of the lynx, it is imperative that project specific analysis and design be completed for all actions that have the potential to affect lynx. Circumstances unique to individual projects or actions and their locations may still result in adverse effects on lynx. In

these cases, additional or modified mitigating measures may be necessary to avoid or minimize adverse effects.

Programmatic Planning - Objectives

Design vegetation management strategies that are consistent with historical succession and disturbance regimes. The broad-scale strategy should be based on a comparison of historical and current ecological processes and landscape patterns, such as age-class distributions and patch size characteristics. It may be necessary to moderate the timing, intensity, and extent of treatments to maintain all required habitat components in lynx habitat, to reduce human influences on mortality risk and interspecific competition, and to be responsive to current social and ecological constraints relevant to lynx habitat.

Programmatic Planning - Standards

1. Conservation measures will generally apply only to lynx habitat on federal lands within LAUs.
2. To facilitate project planning, delineate LAUs. To allow for assessment of the potential effects of the project on an individual lynx, LAUs should be at least the size of area used by a resident lynx and contain sufficient year-round habitat.
3. To be effective for the intended purposes of planning and monitoring, LAU boundaries will not be adjusted for individual projects, but must remain constant.
4. Lynx habitat will be mapped using criteria appropriate to each geographic area.
5. Prepare a broad-scale assessment of landscape patterns that compares historical and current ecological processes and vegetation patterns, such as age-class distributions and patch size characteristics. In the absence of guidance developed from such an assessment, limit disturbance within each LAU as follows: if more than 30 percent of lynx habitat within a LAU is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities by federal agencies.

Programmatic Planning - Guidelines

1. The size of LAUs should generally be 6,500- 10,000 ha (16,000 – 25,000 acres or 25-50 square miles) in contiguous habitat, and likely should be larger in less contiguous, poorer quality, or naturally fragmented habitat. Larger units should be identified in the southern portions of the Northern Rocky Mountains Geographic Area (in Idaho from the Salmon River south, Oregon, Wyoming, and Utah) and in the Southern Rocky Mountains Geographic Area.

In the west, we recommend using watersheds (e.g., 6th code hydrologic unit codes (HUCs) in more northerly portions of geographic areas, and 5th code HUCs in more southerly portions). In the east, terrestrial ecological units that have been delineated at the land type association or subsection level (e.g., LTAs or whatever scale most closely approximates the size of a lynx home range) may be an appropriate context for analysis. Coordinate delineation of LAUs with adjacent administrative units and state wildlife management agencies, where appropriate.

2. After LAUs are identified, their spatial arrangement should be evaluated. Determine the number and arrangement of contiguous LAUs needed to maintain lynx habitat well distributed across the planning area. LAUs with only insignificant amounts of lynx habitat may be discarded, or portions of the unit combined with or divided among neighboring LAUs to provide a meaningful unit for analysis.

Project Planning - Standards

1. Within each LAU, map lynx habitat. Identify potential denning habitat and foraging habitat (primarily snowshoe hare habitat, but also habitat for important alternate prey such as red squirrels), and topographic features that may be important for lynx movement (primary ridge systems, prominent saddles, and riparian corridors). Also identify non-forest vegetation (meadows, shrub-grassland communities, etc.) adjacent to and intermixed with forested lynx habitat that may provide habitat for alternate lynx prey species.
2. Within a LAU, maintain denning habitat in patches generally larger than 5 acres, on at least 10 percent of the area that is capable of producing stands with these characteristics. Where less than 10 percent of the forested lynx habitat within a LAU provides denning habitat, defer those management actions that would delay achievement of denning habitat structure.
3. Maintain habitat connectivity within and between LAUs.

CONSERVATION MEASURES TO ADDRESS RISK FACTORS AFFECTING LYNX PRODUCTIVITY

TIMBER MANAGEMENT IN LYNX HABITAT

Timber management modifies the vegetation structure and mosaic of forested landscapes. Timber management can be used in conjunction with, or in place of, fire as a disturbance process to create and maintain snowshoe

hare habitat. In the southern portion of its range, lynx populations appear to be limited by the availability of snowshoe hare prey, as suggested by large home range sizes, high kitten mortality due to starvation, and greater reliance on alternate prey, especially red squirrels, as compared with populations in northern Canada. Timber management practices should be designed to maintain or enhance habitat for snowshoe hare and alternate prey such as red squirrel. Dense horizontal cover of conifers, just above the snow level in winter, is critical for snowshoe hare habitat. This structure may occur either in regenerating seedling/sapling stands, or as an understory layer in older stands.

Most aspen stands in the Rocky Mountains are in late successional condition as a result of past fire prevention and grazing. In aspen stands intermixed with spruce-fir forests, particularly in southern Idaho, southern Montana, Wyoming, Utah, and Colorado, treatments that result in dense regeneration of aspen are likely to enhance habitat for potential prey of lynx.

Programmatic Planning - Objectives

1. Evaluate historical conditions and landscape patterns to determine historical vegetation mosaics across landscapes through time. For example, large infrequent disturbance events may have been more characteristic of lynx habitat than small frequent disturbances.
2. Maintain suitable acres and juxtaposition of lynx habitat through time. Design vegetation treatments to approximate historical landscape patterns and disturbance processes.
3. If the landscape has been fragmented by past management activities that reduced the quality of lynx habitat, adjust management practices to produce forest composition, structure, and patterns more similar to those that would have occurred under historical disturbance regimes.

Project Planning - Objectives

1. Design regeneration harvest, planting, and thinning to develop characteristics suitable for snowshoe hare habitat.
2. Design project to retain/enhance existing habitat conditions for important alternate prey (particularly red squirrel).

Project Planning - Standards

1. Management actions (e.g., timber sales, salvage sales) shall not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period.

2. Following a disturbance such as blowdown, fire, insects, and disease that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than 5 acres; exceptions would include areas such as developed campgrounds. Where larger areas are affected, retain a minimum of 10% of the affected area per LAU in patches of at least 5 acres to provide future denning habitat. In such areas, defer or modify management activities that would prevent development or maintenance of lynx foraging habitat.
3. In lynx habitat, pre-commercial thinning will be allowed only when stands no longer provide snowshoe hare habitat (e.g., self-pruning processes have eliminated snowshoe hare cover and forage availability during winter conditions with average snow-pack).
4. In aspen stands within lynx habitat in the Cascade Mountains, Northern Rocky Mountains and Southern Rocky Mountains Geographic Areas, apply harvest prescriptions that favor regeneration of aspen.

Project Planning - Guidelines

1. Plan regeneration harvests in lynx habitat where little or no habitat for snowshoe hares is currently available, to recruit a high density of conifers, hardwoods, and shrubs preferred by hares. Consider the following:
 - a) Design regeneration prescriptions to mimic historical fire (or other natural disturbance) events, including retention of fire-killed dead trees and coarse woody debris;
 - b) Design harvest units to mimic the pattern and scale of natural disturbances and retain natural connectivity across the landscape. Evaluate the potential of riparian zones, ridges, and saddles to provide connectivity; and
 - c) Provide for continuing availability of foraging habitat in proximity to denning habitat.
2. In areas where recruitment of additional denning habitat is desired, or to extend the production of snowshoe hare foraging habitat where forage quality and quantity is declining due to plant succession, consider improvement harvests (commercial thinning, selection, etc). Improvement harvests should be designed to:
 - a) Retain and recruit the understory of small diameter conifers and shrubs preferred by hares;

- b) Retain and recruit coarse woody debris, consistent with the likely availability of such material under natural disturbance regimes; and
- c) Maintain or improve the juxtaposition of denning and foraging habitat.

WILDLAND FIRE MANAGEMENT

Wildland fire and insects have historically played the dominant role in maintaining a mosaic of forest successional stages in lynx habitat. Stand-replacing fires were infrequent and affected large areas. In areas with a mixed fire regime, moderate to low intensity fires also occurred in the intervals between stand-replacing events. Refer to the geographic area descriptions for more detailed information regarding historical fire regimes.

Periodic vegetation disturbances maintain the snowshoe hare prey base for lynx. In the period immediately following large stand-replacing fires, snowshoe hare and lynx densities are low. Populations increase as the vegetation grows back and provides dense horizontal cover, until the vegetation grows out of the reach of hares. Low to moderate intensity fires may also stimulate understory development in older stands.

Fire exclusion may have altered the pattern and composition of vegetation in subalpine forests. In the western United States, particularly in the southern portion of the Northern Rocky Mountains Geographic Area and in the Southern Rocky Mountains Geographic Area, fire exclusion is one of the primary factors contributing to the decline or loss of aspen. Aspen communities occupy a small percentage of the total forested area, but they provide important habitat diversity. Aspen/tall forb community types, especially those that include snowberry, serviceberry and chokecherry shrubs in the understory, are very productive and may contribute to the quality of lynx foraging habitat.

Wildland fire management activities include suppression and pre-suppression activities, as well as prescribed fire (natural and management ignitions).

Programmatic Planning - Objectives

1. Restore fire as an ecological process. Evaluate whether fire suppression, forest type conversions, and other forest management practices have altered fire regimes and the functioning of ecosystems.
2. Revise or develop fire management plans to integrate lynx habitat management objectives. Prepare plans for areas large enough to encompass large historical fire events.
3. Use fire to move toward landscape patterns consistent with historical succession and disturbance regimes. Consider use of mechanical pre-treatment and management ignitions if needed to restore fire as an ecological process.

4. Adjust management practices where needed to produce forest composition, structure, and patterns more similar to those that would have occurred under historical succession and disturbance regimes.
5. Design vegetation and fire management activities to retain or restore denning habitat on landscape settings with highest probability of escaping stand-replacing fire events. Evaluate current distribution, amount, and arrangement of lynx habitat in relation to fire disturbance patterns.

Project Planning - Objectives

1. Use fire as a tool to maintain or restore lynx habitat.
2. When managing wildland fire, minimize creation of permanent travel ways that could facilitate increased access by competitors.

Project Planning - Standards

1. In the event of a large wildfire, conduct a post-disturbance assessment prior to salvage harvest, particularly in stands that were formerly in late successional stages, to evaluate potential for lynx denning and foraging habitat.
2. Design burn prescriptions to regenerate or create snowshoe hare habitat (e.g., regeneration of aspen and lodgepole pine).

Project Planning - Guidelines

1. Design burn prescriptions to promote response by shrub and tree species that are favored by snowshoe hare.
2. Design burn prescriptions to retain or encourage tree species composition and structure that will provide habitat for red squirrels or other alternate prey species.
3. Consider the need for pre-treatment of fuels before conducting management ignitions.
4. Avoid constructing permanent firebreaks on ridges or saddles in lynx habitat.
5. Minimize construction of temporary roads and machine fire lines to the extent possible during fire suppression activities.
6. Design burn prescriptions and, where feasible, conduct fire suppression actions in a manner that maintains adequate lynx denning habitat (10% of lynx habitat per LAU).

RECREATION MANAGEMENT

Lynx have evolved a competitive advantage in environments with deep soft snow that tends to exclude other predators during the middle of winter, a time when prey is most limiting (Murray and Boutin 1991, Livaitis 1992, Buskirk et al. 1999). Widespread human activity (snowshoeing, cross-country skiing, snowmobiling, snow cats) may lead to patterns of snow compaction that make it possible for competing predators such as coyotes and bobcats to occupy lynx habitat through the winter, reducing its value to and even possibly excluding lynx (Bider 1962, Ozoga and Harger 1966, Murray et al. 1995, O'Donoghue et al. 1998). In order to maintain a competitive advantage for lynx, it may be necessary to minimize or even preclude snow compacting activities in and around quality snowshoe hare habitat. To not do so may lead to the elimination of lynx, or preclude the ability to re-establish them, in these landscapes.

A consideration for lynx in winter landscapes is exploitation or interference competition from other predator/competitors (Buskirk et al. 1999) and human disturbance (e.g., large developed recreational sites or areas of concentrated winter recreational use). Lynx may be able to adapt to the presence of regular and concentrated recreational use, so long as critical habitat needs are being met. Therefore it is essential that an interconnected network of foraging habitat be maintained that is not subjected to widespread human intervention or competition from other predator species.

In areas of concentrated recreational use (e.g., large ski areas), it may be necessary to maintain or provide "diurnal security habitat". In landscapes where there is widespread or intense recreational use, the natural diurnal patterns of human and lynx activity may provide the opportunity to maintain both uses in the landscape. Most human activity occurs during daylight hours, while lynx appear to be most active dusk to dawn, although weather may affect the time period when lynx are most active (Apps 1999). A key to providing temporal segregation of use may be in ensuring there are places in that landscape where lynx can bed during the day relatively undisturbed. Sites that are similar to denning habitat (i.e., areas that are tangled with large woody debris) will tend to exclude most human activity because of the inherent difficulty they pose for human movement. Diurnal security habitat should be sufficiently large to provide effective and visual insulation from human activity, and must be well distributed and in proximity to foraging habitat.

Where such diurnal security sites exist, they should be protected from actions or activities that would destroy or compromise their functional value. In landscapes where these areas are lacking or inadequate, it may be desirable to create them, focusing on location, adequate size, and an abundance of jackstrawed large woody debris.

Landscape connectivity may be provided by narrow forested mountain ridges, plateaus, or forest stringers that

link more extensive areas of lynx habitat. Woodland riparian communities that provide travel cover across otherwise open areas may also provide connectivity.

Minimizing disturbance around denning habitat is important from May to August.

Programmatic Planning - Objectives

1. Plan for and manage recreational activities to protect the integrity of lynx habitat, considering as a minimum the following:
 - a) Minimize snow compaction in lynx habitat.
 - b) Concentrate recreational activities within existing developed areas, rather than developing new recreational areas in lynx habitat.
 - c) On federal lands, ensure that development or expansion of developed recreation sites or ski areas and adjacent lands address landscape connectivity and lynx habitat needs.

Programmatic Planning - Standards

1. On federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU. This is intended to apply to dispersed recreation, rather than existing ski areas.
2. Map and monitor the location and intensity of snow compacting activities (for example, snowmobiling, snowshoeing, cross-country skiing, dog sledding, etc.) that coincide with lynx habitat, to facilitate future evaluation of effects on lynx as information becomes available.

Programmatic Planning - Guidelines

1. Provide a landscape with interconnected blocks of foraging habitat where snowmobile, cross-country skiing, snowshoeing, or other snow compacting activities are minimized or discouraged.
2. As information becomes available on the impact of snow-compacting activities and disturbance on lynx, limit or discourage this use in areas where it is shown to compromise lynx habitat. Such actions should be undertaken on a priority basis considering habitat function and importance.

Project Planning - Standards

Developed Recreation:

1. In lynx habitat, ensure that federal actions do not degrade or compromise landscape connectivity when planning and operating new or expanded recreation developments.

2. Design trails, roads, and lift termini to direct winter use away from diurnal security habitat.

Dispersed Recreation:

To protect the integrity of lynx habitat, evaluate (as new information becomes available) and amend as needed, winter recreational special use permits (outside of permitted ski areas) that promote snow compacting activities in lynx habitat.

Project Planning - Guidelines

Developed Recreation:

1. Identify and protect potential security habitats in and around proposed developments or expansions.
2. When designing ski area expansions, provide adequately sized coniferous inter-trail islands, including the retention of coarse woody material, to maintain snowshoe hare habitat.
3. Evaluate, and adjust as necessary, ski operations in expanded or newly developed areas to provide nocturnal foraging opportunities for lynx in a manner consistent with operational needs, especially in landscapes where lynx habitat occurs as narrow bands of coniferous forest across the mountain slopes.

FOREST/BACKCOUNTRY ROADS AND TRAILS

Forest and backcountry roads and trails are those that occur on public lands; highways are addressed separately. Refer also to the conservation measures in the Forest Management, Recreation, and Trapping sections.

Plowed roads and groomed over-the-snow routes may allow competing carnivores such as coyotes and mountain lions to access lynx habitat in the winter, increasing competition for prey (Buskirk et al. 1999). However, plowed or created snow roads may be necessary to accomplish winter logging, which may be desirable to meet a variety of resource management objectives.

Preliminary information suggests that lynx may not avoid roads, except at high traffic volumes. Therefore, at this time, there is no compelling evidence to recommend management of road density to conserve lynx. However, new road construction continues to occur in many watersheds within lynx habitat, many of which are already highly roaded, and the effects on lynx are largely unknown. Further research directed at elucidating the effects of road density on lynx is needed.

Programmatic Planning - Objectives

Maintain the natural competitive advantage of lynx in deep snow conditions.

Programmatic Planning - Standards

On federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU. Winter logging activity is not subject to this restriction.

Programmatic Planning - Guidelines

1. Determine where high total road densities (>2 miles per square mile) coincide with lynx habitat, and prioritize roads for seasonal restrictions or reclamation in those areas.
2. Minimize roadside brushing in order to provide snowshoe hare habitat.
3. Locate trails and roads away from forested stringers.
4. Limit public use on temporary roads constructed for timber sales. Design new roads, especially the entrance, for effective closure upon completion of sale activities.
5. Minimize building of roads directly on ridgetops or areas identified as important for lynx habitat connectivity.

LIVESTOCK GRAZING

In riparian areas within lynx habitat, ungulate forage use levels may reduce forage resources available to snowshoe hares. Browsing or grazing can have a direct effect on snowshoe hare habitat if it alters the structure or composition of native plant communities.

Throughout the Rocky Mountains, grazing has been a factor in the decline or loss of aspen as a seral species in subalpine forests. Young, densely regenerating aspen stands with a well-developed understory provide good quality habitat for snowshoe hares and other potential lynx prey species, such as grouse. Grazing should be managed to allow for regeneration of aspen clones.

Particularly in the naturally fragmented habitats of the western United States, inclusions of high elevation shrub-steppe habitats often may exist within the home range of a lynx. Resident lynx are also known to occasionally make exploratory movements out of their home ranges (Squires and Laurion 1999, Aubry et al. 1999), encountering these habitats and potential alternate prey such as ground squirrels and jackrabbits. Therefore, shrub-steppe habitats within the elevational ranges of forested lynx habitat should be considered lynx habitat and be managed to maintain or achieve mid-seral or higher conditions, thereby providing maximum natural cover and prey availability. Those areas that are currently in late seral condition should not be degraded.

Programmatic Planning - Objectives

In lynx habitat and adjacent shrub-steppe habitats, manage grazing to maintain the composition and structure of native plant communities.

Project Planning - Objectives

1. Manage livestock grazing within riparian areas and willow carrs in lynx habitat to provide conditions for lynx and lynx prey.
2. Maintain or move towards native composition and structure of herbaceous and shrub plant communities.
3. Ensure that ungulate grazing does not impede the development of snowshoe hare habitat in natural or created openings within lynx habitat.

Project Planning - Standards

1. Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components. Delay livestock use in post-fire and post-harvest created openings until successful regeneration of the shrub and tree components occurs.
2. Manage grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.
3. Within the elevational ranges that encompass forested lynx habitat, shrub-steppe habitats should be considered as integral to the lynx habitat matrix and should be managed to maintain or achieve mid seral or higher condition.
4. Within lynx habitat, manage livestock grazing in riparian areas and willow carrs to maintain or achieve mid seral or higher condition to provide cover and forage for prey species.

OTHER HUMAN DEVELOPMENTS: OIL AND GAS LEASING, MINES, RESERVOIRS, AGRICULTURE

Most of these activities affect lynx habitat by changing or eliminating native vegetation, and may also contribute to fragmentation. The primary effects of leases and mines on lynx are probably related to the potential for plowed roads to provide access for lynx competitors, particularly coyotes. Construction of reservoirs will be handled under normal FERC and consultation procedures, and no conservation measures were developed specific to those projects.

Programmatic Planning - Objectives

Design developments to minimize impacts on lynx habitat.

Programmatic Planning - Guidelines

Map oil and gas production and transmission facilities, mining activities and facilities, dams, and agricultural lands on public lands and adjacent private lands, in order to assess cumulative effects.

Project Planning - Standards

On projects where over-snow access is required, restrict use to designated routes.

Project Planning - Guidelines

1. If activities are proposed in lynx habitat, develop stipulations for limitations on the timing of activities and surface use and occupancy at the leasing stage.
2. Minimize snow compaction when authorizing and monitoring developments. Encourage remote monitoring of sites that are located in lynx habitat, so that they do not have to be visited daily.
3. Develop a reclamation plan (e.g., road reclamation and vegetation rehabilitation) for abandoned well sites and closed mines to restore suitable habitat for lynx.
4. Close newly constructed roads (built to access mines or leases) in lynx habitat to public access during project activities. Upon project completion, reclaim or obliterate these roads.

CONSERVATION MEASURES TO ADDRESS MORTALITY RISK FACTORS

TRAPPING (LEGAL AND NON-TARGET)

Lynx are known to be very vulnerable to trapping. Ward and Krebs (1985) stated that trapping was the single most important mortality factor in their Yukon study area. Incidental trapping of lynx can occur in areas where regulated trapping of other species overlaps with lynx habitat (Mech 1973, Carbyn and Patriquin 1983, Squires and Laurion 1999). Lynx may be more vulnerable to trapping near open roads (Koehler and Aubry 1994, Bailey et al. 1986).

The U.S. Fish and Wildlife Service (FWS) is proposing to work with the States to develop a 4-d. rule for all regulated or unregulated trapping (e.g., coyote, wolverine, bobcat, fox) in lynx habitats by establishing adequate trapping protocols to minimize incidental take. Each state would work with FWS to customize the protocol for their specific regions.

Programmatic Planning - Objectives

Reduce incidental harm or capture of lynx during regulated and unregulated trapping activity, and ensure retention of an adequate prey base.

Programmatic Planning - Guidelines

Federal agencies should work cooperatively with States and Tribes to reduce incidental take of lynx related to trapping.

PREDATOR CONTROL

Predator control activities conducted on federal lands by Wildlife Services include trapping, shooting, and poisoning animals on domestic livestock allotments, occasionally within lynx habitat. Similar efforts may be conducted on adjacent private lands. Although such actions are intended to target the offending animal, non-target animals including lynx may be impacted.

Programmatic Planning - Objectives

Reduce incidental harm or capture of lynx during predator control activities, and ensure retention of adequate prey base.

Programmatic Planning - Standards

Predator control activities, including trapping or poisoning on domestic livestock allotments on federal lands within lynx habitat, will be conducted by Wildlife Services personnel in accordance with FWS recommendations established through a formal Section 7 consultation process.

SHOOTING

Lynx may be mistakenly shot by legal predator hunters seeking bobcats, or illegally by poachers. Prey species, such as snowshoe hares and ground squirrels, may also be affected by legal shooting.

Programmatic planning - Objectives

Reduce lynx mortalities related to mistaken identification or illegal shooting.

Programmatic Planning - Guidelines

1. Initiate interagency information and education efforts throughout the range of lynx in the contiguous states. Utilize trailhead posters, magazine articles, news releases, state hunting and trapping regulation booklets, etc., to inform the public of the possible presence of lynx, field identification, and their status.
2. Federal agencies should work cooperatively with States and Tribes to ensure that important lynx prey are conserved.

COMPETITION AND PREDATION AS INFLUENCED BY HUMAN ACTIVITIES

Habitat changes that benefit competitor/ predator species, including some vegetation management practices and providing packed snow travel ways, may lead to increased starvation or direct mortality of lynx. Refer also to applicable conservation measures in the Forest Management, Recreation, and Forest/ Backcountry Roads and Trails sections.

Programmatic Planning - Objectives

Maintain the natural competitive advantage of lynx in deep snow conditions.

Programmatic Planning - Standards

1. On federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU. This is intended to apply to dispersed recreation, rather than existing ski areas.

HIGHWAYS

Direct mortality from vehicular collisions may be detrimental to lynx populations in the lower 48 states. Mortality levels can drastically increase with relatively small increases in traffic volumes and speed.

Programmatic Planning - Objectives

Reduce the potential for lynx mortality related to highways.

Programmatic Planning - Standards

Within lynx habitat, identify key linkage areas and potential highway crossing areas.

Programmatic Planning - Guidelines

Where needed, develop measures such as wildlife fencing and associated underpasses or overpasses to reduce mortality risk.

CONSERVATION MEASURES TO ADDRESS MOVEMENT AND DISPERSAL

It is essential to provide landscape connectivity so that all or most habitat has the potential of being occupied, and populations remain connected.

At the southern periphery and eastern portions of lynx range, habitat occurs in narrow fragmented bands (man-made or naturally-occurring), or has been fragmented by human developments. Connected forested habitats allow lynx, and other large and medium size carnivores, to easily move long distances in search of food, cover, and mates. Highways and private lands that are subdivided for commercial or residential developments or have high human use patterns can interrupt existing habitat connectivity and further fragment lynx habitat, reducing the

potential for population interchange. In some areas, particularly the eastern United States, habitat connectivity may be difficult to achieve because of mixed ownerships. Land exchanges and cooperative management with private landowners may be the only options available to provide landscape connectivity.

Shrub-steppe habitats provide connectivity between mountain ranges and other blocks of primary forested lynx habitat. Where blocks of lynx habitat are separated by intervening basins, valleys, or high mesas of shrub-steppe, land managers should evaluate those shrub-steppe expanses for potential to provide landscape connectivity. Vegetative or geomorphic features within shrub-steppe habitats that may be particularly important are riparian systems and relatively high ridge systems. Where such features exist, land management practices should be consistent with maintaining landscape connectivity. Livestock grazing within shrub-steppe habitats in such areas should be managed to maintain or achieve mid seral or higher condition, to maximize cover and prey availability. Such areas that are currently in late seral condition should not be degraded.

Programmatic Planning - Objectives

Maintain and, where necessary and feasible, restore habitat connectivity across forested landscapes.

Programmatic Planning - Standards

1. Identify key linkage areas that may be important in providing landscape connectivity within and between geographic areas, across all ownerships.
2. Develop and implement a plan to protect key linkage areas on federal lands from activities that would create barriers to movement. Barriers could result from an accumulation of incremental projects, as opposed to any one project.
3. Evaluate the potential importance of shrub-steppe habitats in providing landscape connectivity between blocks of primary lynx habitat. Livestock grazing within shrub-steppe habitats in such areas should be managed to maintain or achieve mid seral or higher condition, to maximize cover and prey availability. Such areas that are currently in late seral condition should not be degraded.

Programmatic Planning - Guidelines

Where feasible, maintain or enhance native plant communities and patterns, and habitat for potential lynx prey, within identified key linkage areas. Pursue opportunities for cooperative management with other landowners.

HIGHWAYS

Highways impact lynx and other carnivores by fragmenting habitat and impeding movements. As traffic lanes, volume, speeds, and right-of-way width increase,

the effects on lynx and other carnivores are magnified. As human demographics change, highways tend to increase in size and traffic density. Special concern must be given to the development of new highways (gravel roads being paved), and changes in highway design, such as additions in the number of traffic lanes, widening of rights-of-way, or other modifications to increase highway capacity or speed.

Within key linkage areas, highway crossing structures should be employed to reduce effects on wildlife. Information from Canada (Trans-Canada Highway) suggests crossings should generally be at ½-mile intervals and not farther than 1 mile apart, depending on topographic and vegetation features.

Programmatic Planning - Objectives

Ensure that connectivity is maintained across highway rights-of-way.

Programmatic Planning - Standards

1. Federal land management agencies will work cooperatively with the Federal Highway Administration and State Departments of Transportation to address the following within lynx geographic areas:
 - a) Identify land corridors necessary to maintain connectivity of lynx habitat.
 - b) Map the location of "key linkage areas" where highway crossings may be needed to provide habitat connectivity and reduce mortality of lynx (and other wildlife).

Programmatic Planning - Guidelines

Evaluate whether land ownership and management practices are compatible with maintaining lynx highway crossings in key linkage areas. On public lands, management practices will be compatible with providing habitat connectivity. On private lands, agencies will strive to work with landowners to develop conservation easements, exchanges, or other solutions.

Project Planning - Standards

1. Identify, map, and prioritize site-specific locations, using topographic and vegetation features, to determine where highway crossings are needed to reduce highway impacts on lynx.
2. Within the range of lynx, complete a biological assessment for all proposed highway projects on federal lands. A land management agency biologist will review and coordinate with highway departments on development of the biological assessment.

Project Planning - Guidelines

Dirt and gravel roads traversing lynx habitat (particularly those that could become highways) should not be

paved or otherwise upgraded (e.g., straightening of curves, widening of roadway, etc.) in a manner that is likely to lead to significant increases in traffic volumes, traffic speeds, increased width of the cleared ROW, or would foreseeably contribute to development or increases in human activity in lynx habitat. Such projects may increase habitat fragmentation, create a barrier to movements, increase mortality risks due to vehicle collisions, and generate secondary adverse effects by inducing, facilitating, or exacerbating development and human activity in lynx habitat. Whenever rural dirt and gravel roads traversing lynx habitat are proposed for such upgrades, a thorough analysis should be conducted on the potential direct and indirect effects to lynx and lynx habitat.

LAND OWNERSHIP

Lynx exemplify the need for landscape-level ecosystem management. Contiguous tracts of land in public ownership (national forests, national parks, wildlife refuges, and BLM lands) provide an opportunity for management that can maintain lynx habitat connectivity. Throughout most of the lynx range in the lower 48 states, connectivity with habitats and populations in Canada is critical for maintaining populations in the U.S.

Programmatic Planning - Objectives

Retain lands in key linkage areas in public ownership.

Programmatic Planning - Standards

Identify key linkage areas by management jurisdiction(s) in management plans and prescriptions.

Programmatic Planning - Guidelines

In land adjustment programs, identify key linkage areas. Work towards unified management direction via habitat conservation plans, conservation easements or agreements, and land acquisition.

Project Planning - Standards

1. Develop and implement specific management prescriptions to protect/ enhance key linkage areas.
2. Evaluate proposed land exchanges, land sales, and special use permits for effects on key linkage areas.

SKI AREAS/LARGE RESORTS AND ASSOCIATED ACTIVITIES

Ski areas and large resorts are often developed in and across bands of high elevation boreal forests containing lynx habitat. Landscape location, the high intensity of recreational and operational use, and associated development pose a risk to lynx movement and dispersal. Developments that may impede lynx movement occur in Utah and western Wyoming (Northern Rocky Mountains Geographic Area), Colorado (Southern Rocky Mountains Geographic Area), and possibly portions of the Northeast Geographic Area.

Programmatic Planning - Objectives

When conducting landscape level planning on Federal lands, allocate land uses such that landscape connectivity is maintained.

Programmatic Planning - Standards

Within identified key linkage areas, provide for landscape connectivity.

Project Planning - Standards

When planning new or expanding recreational developments, ensure that key linkage areas are protected.

Project Planning - Guidelines

Plan recreational development, and manage recreational and operational uses to provide for lynx movement and to maintain effectiveness of lynx habitat.

This information has been excerpted from the Canada Lynx Conservation Assessment and Strategy. The entire assessment and strategy, along with the amendment proposed for the Northern Rockies can found on the U.S. Fish and Wildlife Service website at:

<http://www.fs.fed/r1/planning/lynx/reports/lcas.pdf>

Executive Summary	The purpose of this report is to provide information on the current status of lynx habitat in the Northern Rockies and to provide recommendations for the future. The report is organized into four main sections: Executive Summary, Introduction, Findings, and Recommendations. The Executive Summary provides a brief overview of the report's findings and recommendations. The Introduction provides background information on the lynx and its habitat. The Findings section discusses the current status of lynx habitat and the threats to it. The Recommendations section provides suggestions for how to protect and restore lynx habitat.
Introduction	There is a growing concern about the status of lynx habitat in the Northern Rockies. The lynx is a large predator that plays an important role in the ecosystem. It is important to understand the current status of lynx habitat and the threats to it in order to develop effective conservation strategies. This report provides information on the current status of lynx habitat and the threats to it, and provides recommendations for how to protect and restore lynx habitat.
Findings	There is a growing concern about the status of lynx habitat in the Northern Rockies. The lynx is a large predator that plays an important role in the ecosystem. It is important to understand the current status of lynx habitat and the threats to it in order to develop effective conservation strategies. This report provides information on the current status of lynx habitat and the threats to it, and provides recommendations for how to protect and restore lynx habitat.
Recommendations	There is a growing concern about the status of lynx habitat in the Northern Rockies. The lynx is a large predator that plays an important role in the ecosystem. It is important to understand the current status of lynx habitat and the threats to it in order to develop effective conservation strategies. This report provides information on the current status of lynx habitat and the threats to it, and provides recommendations for how to protect and restore lynx habitat.
Conclusion	There is a growing concern about the status of lynx habitat in the Northern Rockies. The lynx is a large predator that plays an important role in the ecosystem. It is important to understand the current status of lynx habitat and the threats to it in order to develop effective conservation strategies. This report provides information on the current status of lynx habitat and the threats to it, and provides recommendations for how to protect and restore lynx habitat.
References	There is a growing concern about the status of lynx habitat in the Northern Rockies. The lynx is a large predator that plays an important role in the ecosystem. It is important to understand the current status of lynx habitat and the threats to it in order to develop effective conservation strategies. This report provides information on the current status of lynx habitat and the threats to it, and provides recommendations for how to protect and restore lynx habitat.
Appendix	There is a growing concern about the status of lynx habitat in the Northern Rockies. The lynx is a large predator that plays an important role in the ecosystem. It is important to understand the current status of lynx habitat and the threats to it in order to develop effective conservation strategies. This report provides information on the current status of lynx habitat and the threats to it, and provides recommendations for how to protect and restore lynx habitat.

APPENDIX G – RECREATION OPPORTUNITY SPECTRUM CLASSES

Defining recreation opportunities is used as a tool to help recreation managers create and maintain the appropriate recreation experiences that suits various types of land and visitors. The ROS continuum characterizes recreation opportunities in terms of setting,

activity, and experience. The spectrum contains six classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, modern urban.

ROS	Class Descriptions
Primitive	Opportunity for isolation from man-made sights, sounds, and management controls in an unmodified natural environment. Only facilities essential for resource protection are available. A high degree of challenge and risk are present. Visitors use outdoor skills and have minimal contact with other users or groups. Motorized use is prohibited.
Semi-primitive non-motorized	Some opportunity for isolation from man-made sights, sounds, and management controls in a predominantly unmodified environment. Opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk and to use outdoor skills. Concentration of visitors is low, but evidence of users is often present. On-site managerial controls are subtle. Facilities are provided for resource protection and the safety of users. Motorized use is prohibited.
Semi-primitive motorized	Some opportunity for isolation from man-made sights, sounds, and management controls in a predominantly unmodified environment. Opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk and to use outdoor skills. Concentration of visitors is low, but evidence of other area users is present. On-site managerial controls are subtle. Facilities are provided for resource protection and the safety of users. Motorized use is permitted.
Roaded Natural	Mostly equal opportunities to affiliate with other groups or be isolated from sights and sounds of man. The landscape is generally natural with modifications moderately evident. Concentration of users is low to moderate, but facilities for group activities may be present. Challenge and risk opportunities are generally not important in this class. Opportunities for both motorized and non-motorized activities are present. Construction standards and facility design incorporate conventional motorized uses.
Roaded Modified	Similar to the Roaded Natural setting, except this area has been heavily modified (roads or recreation facilities). This class still offers opportunity to have a high degree of interaction with the natural environment and to have moderate challenge and risk and to use outdoor skills.
Rural	Area is characterized by a substantially modified natural environment. Opportunities to affiliate with others are prevalent. The convenience of recreation sites and opportunities are more important than a natural landscape or setting. Sights and sounds of man are readily evident, and the concentration of users is often moderate to high. Developed sites, roads, and trails are designed for moderate to high uses.
Urban	Area is characterized by a substantially urbanized environment, although the background may have natural-appealing elements. High levels of human activity and concentrated development, including recreation opportunities are prevalent. Developed sites, roads and other recreation opportunities are designed for high use.

APPENDIX C - REVISIONS

OPPORTUNITY STATEMENTS

During the revision process, the following changes were made to the Opportunity Statements. The changes are listed in the table below, along with the reason for the change and the date of the revision.

Revision	Change	Reason	Date
1	Added a new section titled "Opportunity Statement" to the beginning of the document.	To provide a clear and concise overview of the Opportunity Statement.	10/1/2023
2	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
3	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
4	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
5	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
6	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
7	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
8	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
9	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023
10	Revised the "Opportunity Statement" section to include more details about the program.	To provide more information about the program and its goals.	10/1/2023

APPENDIX H – AREAS OF CRITICAL ENVIRONMENTAL CONCERN



US Department of the Interior

Bureau of Land Management
Butte Field Office, Montana

March 2006



Butte Resource Management Plan

Final Report on Importance and Relevance Criteria and Findings for Areas of Critical Environmental Concern Considerations

Prepared for:



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APPENDIX H - AREAS OF CRITICAL
ENVIRONMENTAL CONCERN

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Public Resource Management Plan

Final Report on
Importance and Relevance
Criteria and Findings for
Areas of Critical Environmental
Concern Considerations



Page 100



US Department of the Interior, Bureau of Land Management

1600 North Lincoln Avenue

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LIST OF ACRONYMS

Acronym or Abbreviation	Full Phrase
ACEC	Area of Critical Environmental Concern
BLM	United States Department of the Interior, Bureau of Land Management
FLPMA	Federal Land Policy and Management Act
Forest Service	United States Department of Agriculture, Forest Service
MOU	memorandum of understanding
Planning Area	Butte Resource Management Plan planning area
RMP	resource management plan
US	United States
WSA	Wilderness Study Area

IMPORTANCE AND RELEVANCE CRITERIA AND FINDINGS FOR AREAS OF CRITICAL ENVIRONMENTAL CONCERN CONSIDERATIONS

1. EXECUTIVE SUMMARY

As part of the land use planning process for the Butte Resource Management Plan (RMP), a US Department of the Interior, Bureau of Land Management (BLM) interdisciplinary team reviewed ten nominations for special designation as Areas of Critical Environmental Concern (ACECs). Five nominations were external (made by other agencies or the public), three were internal (made by BLM specialists), one was recommended for study in a 1979 BLM management plan (BLM 1979), and one is an existing ACEC. The team analyzed the ten areas to determine if they contain values that meet the relevance and importance criteria for consideration as potential ACECs.

Five areas were found to meet the relevance and importance criteria: Elkhorn Mountains, the existing Sleeping Giant ACEC, Spokane Creek, Ringing Rocks, and Humbug Spires. These areas are identified as potential ACECs. Various alternatives in the Draft RMP will recommend the areas for designation as ACECs (or continued designation in the case of Sleeping Giant ACEC) if special management is required to protect the relevant and important values. Areas found not to meet the relevance and importance criteria are not carried forward as potential ACECs.

2. INTRODUCTION

The Federal Land Policy and Management Act (FLPMA) and BLM policy (Manual 1613 [BLM 1988a]) require the BLM to give priority to the designation and protection of ACECs during the land use planning process. The BLM, Butte Field Office, is currently revising its older land use plans, the Headwaters RMP (BLM 1984) and the Dillon Management Framework Plan (BLM 1979). The revised RMP will provide a single, comprehensive land use plan that will guide management of public land administered by the Butte Field Office over the next 15 to 20 years. Only that public and federal mineral estate managed by BLM within the Butte Field Office boundary is the subject of this document.

The BLM Butte Field Office Planning Area is in mid-western Montana (**Figure 1**). Within the Planning Area, BLM administers about 311,000 acres of public surface land and 656,000 acres of federal mineral estate in Lewis and Clark, Jefferson, Broadwater, Deer Lodge, Beaverhead, Silver Bow, Gallatin, and Park Counties.

This analysis and the resultant findings for ACEC relevance and importance criteria has been performed pursuant to FLPMA Section 202 (43 US Code 1712[c][3]), 43 Code of Federal Regulations 1610.7-2 and BLM Manual 1613 (BLM 1988a).

2.1 What is an Area of Critical Environmental Concern?

FLPMA Section 103 (43 US Code 1702[a]) and 43 Code of Federal Regulations 1601.0-5(a) describes ACECs as "areas within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards." Therefore, only BLM-administered lands are included in ACEC boundaries.

Designation of an ACEC in and of itself does not automatically prohibit or restrict other uses in the area. The one exception is that a mining plan of operation is required for any proposed mining activity within a designated ACEC. The ACEC designation is an administrative designation that is accomplished through the land use planning process. It is unique to BLM in that no other agency uses this form of designation.

The intent of Congress in mandating the designation of ACECs through FLPMA was to give priority to the designation and protection of areas containing unique and significant resource values. The BLM staff followed guidance set forth in BLM Manual 1613 for the process of identifying and evaluating potential ACECs. This report documents the first three steps in the process: compiling a list of areas recommended for ACEC designation, obtaining information on relevance and importance, and evaluating each resource or hazard to determine if it meets

both the relevance and importance criteria. The remaining two steps, public comment on proposed ACECs and ACEC designation, will be completed after publishing this draft report. Section 3 describes these steps.

3. STEPS IN THE ACEC PROCESS

This section summarizes the five main steps in the identification and evaluation of ACECs.

3.1 Nomination

BLM staff, other agencies, or members of the public may nominate ACECs at any time, but they are only designated during the BLM land use planning process. External nominations from agencies and the public generally are solicited during an RMP's scoping process. In addition, BLM regulations require reconsideration of existing ACECs during RMP revision (BLM 1988a).

3.2 Evaluation of Nominations for Relevance and Importance

Each nominated area is evaluated to determine if it meets the relevance and importance criteria listed in BLM Manual 1613. A nomination must meet one or more of the relevance criteria *and* the importance criteria to be considered a potential ACEC.

Relevance Criteria

Does the area contain one or more of the following values?

1. A significant historic, cultural, or scenic value (including but not limited to rare or sensitive archeological resources and religious or cultural resources important to native Americans);
2. A fish or wildlife resource (including but not limited to habitat for endangered, sensitive, or threatened species, or habitat essential for maintaining species diversity);
3. A natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relict plants or plant communities that are terrestrial, aquatic, or riparian; or rare geological features); and/or
4. A natural hazard (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the RMP process that it has become part of a natural process.

Importance Criteria

Does the value, resource, system, process, or hazard have substantial significance or value?
Does it meet one or more of the following criteria?

1. Does it have more than locally significant qualities that give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource?
2. Does it have qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change?
3. Has it been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA?
4. Does it have qualities that warrant highlighting in order to satisfy public or management concerns about safety and public welfare?
5. Does it pose a significant threat to human life and safety or property?

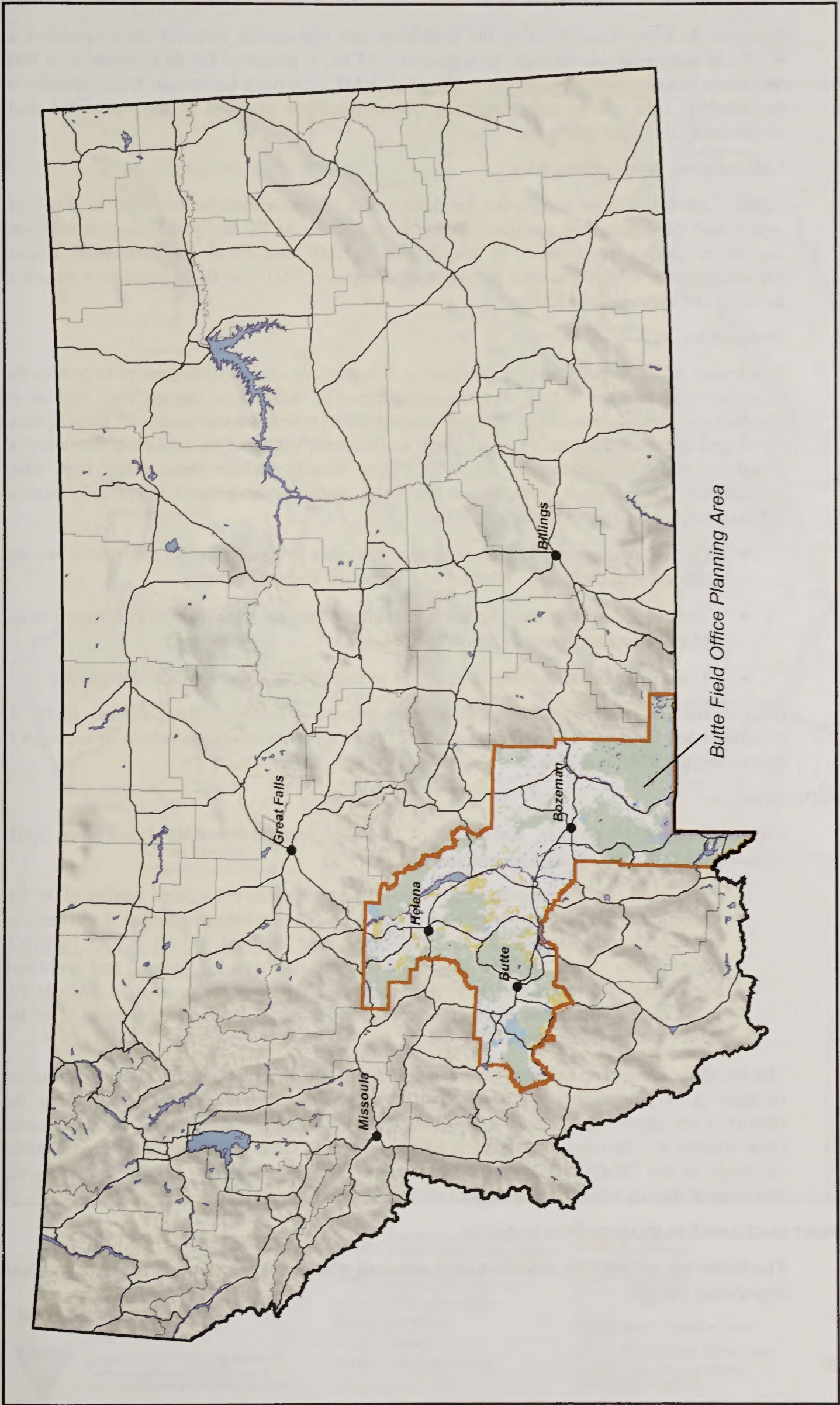


FIGURE 1
Butte RMP Planning Area, Montana
BLM, Butte Field Office
Butte RMP and EIS

0 Miles 60

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3.3 Consideration of Potential ACECs

Potential ACECs (those meeting the relevance and importance criteria) are considered as RMP alternatives are developed. Each potential ACEC is proposed for designation in at least one of the management alternatives in the Draft RMP. The need for special management and the resulting effects from applying such management are assessed in the associated draft environmental impact statement.

3.4 Comment on Proposed ACECs

Public feedback will be sought on the designation recommendations included in this draft report, and the public may comment on any aspect of the ACEC analysis. The comments are considered during preparation of the Proposed RMP and Final Environmental Impact Statement. After a 30-day protest period on the Proposed RMP, the BLM prepares a record of decision and approves the RMP.

3.5 Designation

A potential ACEC is proposed for designation if it requires special management to protect the important and relevant values. Special management is defined as management outside of standard or routine practices. Special management refers to management prescriptions developed expressly to protect the important and relevant values of the area from the potential effects of actions permitted by the RMP. They usually include more detail than other management prescriptions contained in the RMP. Special management is typically needed when one of the following conditions is met:

- Current management or management activities proposed in the alternative are not sufficient to protect the relevant and important resource values;
- The needed management action is considered unusual or outside of the normal range of management practices typically used; or
- The change in management is difficult to implement without ACEC designation.

Only if analysis determines that special management is required, the potential ACEC is recommended for designation. Designation of ACECs occurs when the record of decision is signed and the RMP is approved.

4. NOMINATIONS

For the Butte RMP process, the notice of intent to prepare the RMP (December 2003) included the following request for nominations:

“The BLM is ... requesting public input for nominations considered worthy of ACEC designation. To be considered as a potential ACEC, an area must meet the criteria of relevance and importance as established and defined in 43 CFR 1610.7-2. Nominations must include descriptive materials, detailed maps, and evidence supporting the ‘relevance’ and ‘importance’ of the resource or area. ... All ACEC nominations within the planning area will be evaluated during development of the RMP” (Federal Register 2003).

The BLM received five external nominations from four different sources. Each nomination included a varying degree of descriptive materials, maps, and evidence supporting the relevance and importance of each area. In addition, the BLM interdisciplinary team evaluated three internal nominations, one existing ACEC (Sleeping Giant), and one area recommended for study in the Dillon Management Framework Plan (BLM 1979). **Figure 2** depicts the locations of the ten areas. Evaluations of each area are provided below.

5. IMPORTANCE AND RELEVANCE EVALUATIONS

The following information describes each area and whether or not it meets the relevance and importance criteria.

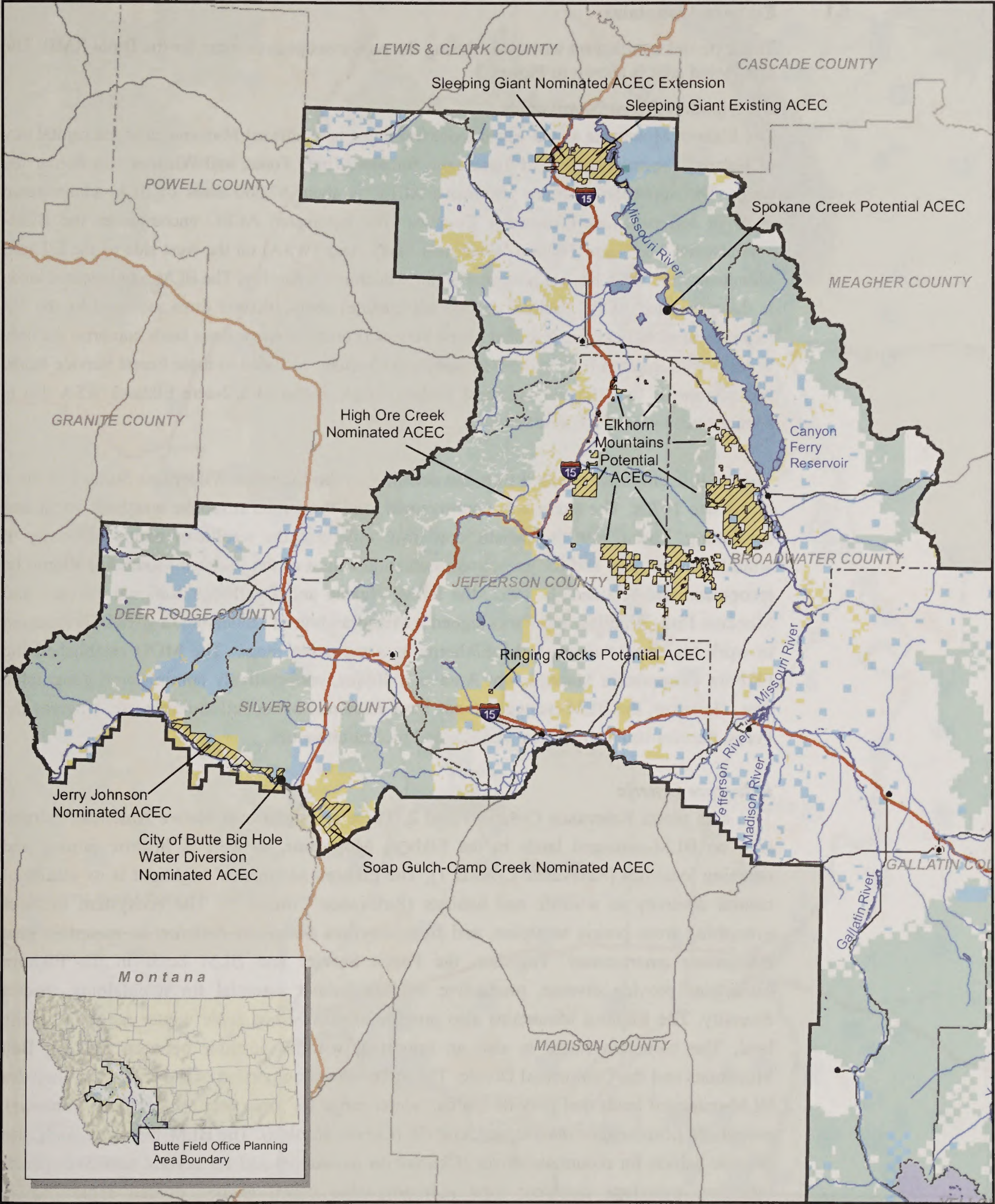
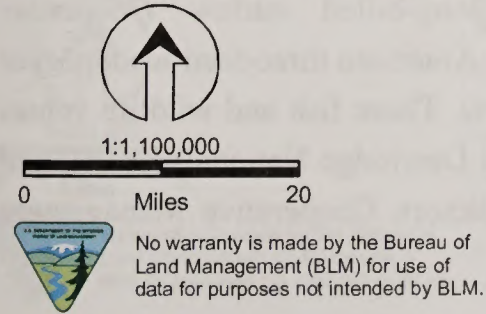


FIGURE 2

Nominated Areas of Critical Environmental Concern Considered BLM, Butte Field Office Butte RMP and EIS



- Potential Area of Critical Environmental Concern (ACEC)
- Butte Field Office Planning Area Boundary
- Rivers and Streams
- Interstates
- Roads
- County Boundaries
- Bureau of Land Management (BLM) Lands
- Bureau of Reclamation (BOR) Lands
- Private Lands
- State of Montana Lands
- USDA Forest Service Lands
- USDI Fish and Wildlife Service Lands

5.1 Elkhorn Mountains

This external nomination was made during the public scoping process for the Butte RMP. The nominated area is shown in **Figure 3**.

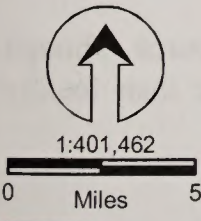
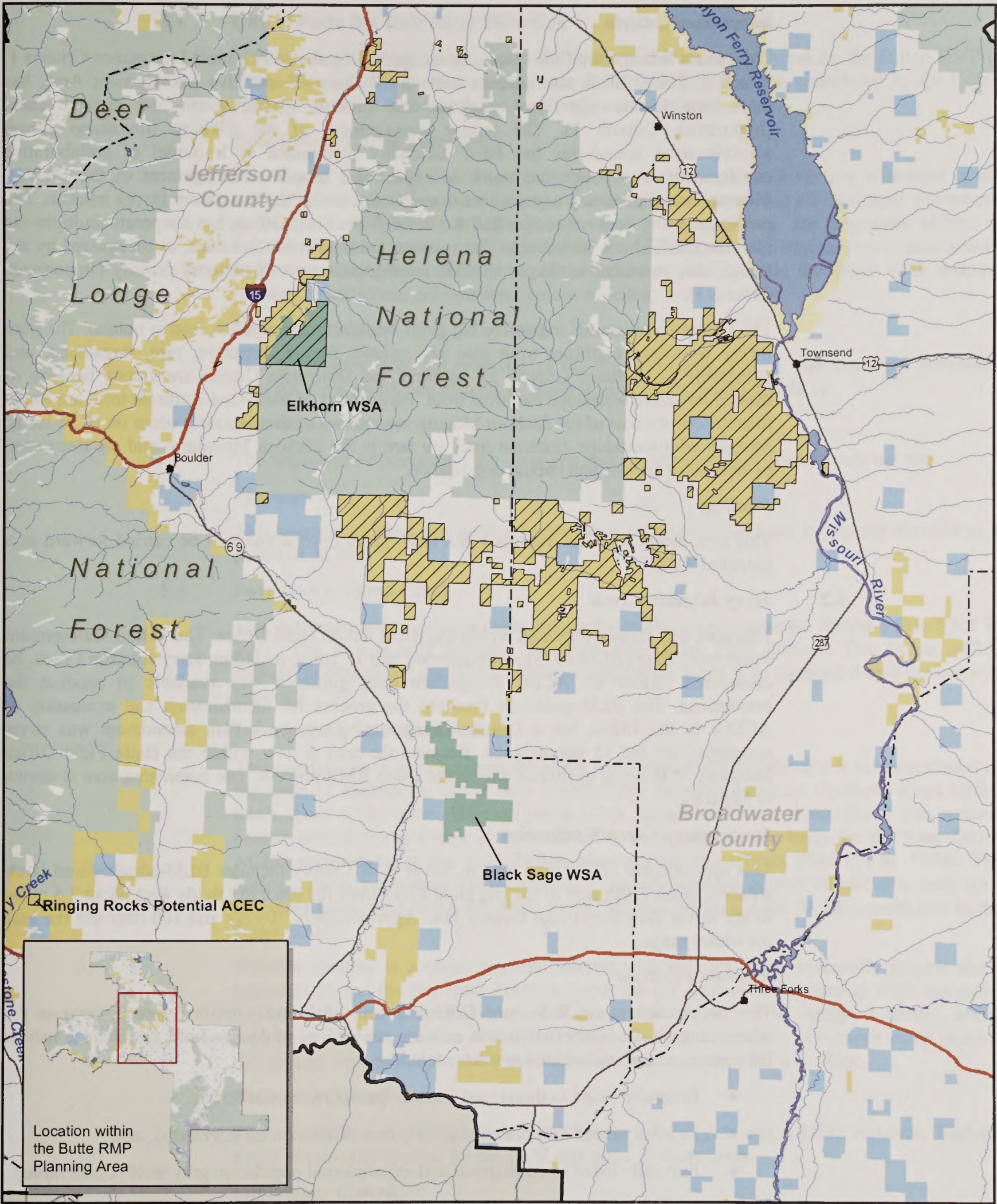
Description of Area/Nomination

The Elkhorn Mountains are an island mountain range in southwest Montana, near the capital city of Helena. The communities of Townsend, Boulder, Three Forks, and Winston also border the range. The nominated Elkhorn Mountains ACEC is about 67,500 acres of BLM-administered lands in Jefferson and Broadwater Counties. The nominated ACEC encompasses the BLM-administered 3,575-acre Elkhorn Wilderness Study Area (WSA) on the west side of the Elkhorn Mountains; this WSA has not been studied for wilderness suitability. The BLM-administered lands in the nominated ACEC encircle (but do not include) about 160,000 acres managed by the US Department of Agriculture, National Forest Service (Forest Service); these lands comprise the only Wildlife Management Unit in the National Forest System. Included in these Forest Service lands, and adjacent to the BLM-administered Elkhorn WSA, is the 64,522-acre Elkhorn WSA that is administered by the US Forest Service.

The wildlife emphasis resulted from the decision on the Elkhorns Wilderness Study EIS done in the late 1970s. The study was controversial, and the public response was both vocal and conflicting. Throughout the debate, consensus emerged: the wealth of natural diversity in wildlife and habitats and the associated recreation values of the Elkhorn Mountains should be recognized and retained. In 1992, the BLM, Helena and Deerlodge National Forests, and Montana Fish, Wildlife, and Parks signed a Memorandum of Understanding (MOU) agreeing to work together to manage the Elkhorns as a mountain range. The MOU established the Elkhorn Cooperative Management Area as a unique, cooperatively administered geographic area. However, the BLM-managed lands have remained under full multiple use, whereas the Forest Service lands emphasize wildlife and recreation values.

Relevance Criteria

This area meets Relevance Criteria 1 and 2. There are significant Native American cultural sites on BLM-managed lands in the Elkhorn Mountains, as well as historic mining and ranching localities (Relevance Criteria 1). The Elkhorn Mountains' highlight is its wealth of natural diversity in wildlife and habitats (Relevance Criteria 2). The ecosystem includes everything from prairie to alpine, and from mayflies (*Ameletus bellulus*) to mountain goat (*Oreamnos americanus*). Together, the Forest Service and BLM lands in the Elkhorn Mountains provide diverse, productive wildlife habitat essential for maintaining species diversity. The Elkhorn Mountains also provide expansive big game winter range on public land. The mountain range is also an important wildlife corridor between the Big Belt Mountains and the Continental Divide. The lower-elevation portion of the ecosystem includes BLM-managed lands that provide critical winter range for mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and elk (*Cervus elaphus*). The BLM-managed lands also provide habitat for mountain plover (*Charadrius montanus*) and for several sensitive species including westslope cutthroat trout (*Oncorhynchus clarki lewisi*), golden eagle (*Aquila chrysaetos*), northern goshawk (*Accipiter gentilis*), long-billed curlew (*Numenius americanus*), black-backed woodpecker (*Picoides arcticus*), American three-toed woodpecker (*Picoides dorsalis*), and Brewer's sparrow (*Spizella breweri*). These fish and wildlife values are recognized by the MOU between the BLM, Helena and Deerlodge National Forests, and Montana Fish, Wildlife, and Parks that establishes the Elkhorn Cooperative Management Area.



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- Wilderness Study Area (WSA)
- Potential Area of Critical Environmental Concern (ACEC)
- Butte Field Office Planning Area Boundary
- Rivers and Streams
- Interstates
- Roads
- County Boundaries
- Bureau of Land Management (BLM) Lands
- Bureau of Reclamation (BOR) Lands
- Private Lands
- State of Montana Lands
- USDA Forest Service Lands
- USDI Fish and Wildlife Service Lands

FIGURE 3

Location of Potential Area of Critical Environmental Concern
Elkhorn Mountains
BLM, Butte Field Office
Butte RMP and EIS

Importance Criteria

This area's fish and wildlife values, as recognized by the MOU, meet Importance Criteria 1, 2, and 3. The wildlife management unit, the Elkhorn Cooperative Management Area, has more than locally significant qualities that give it special worth and distinctiveness (Importance Criteria 1). The unique management of the Elkhorn Mountains across administrative boundaries has been nationally recognized as a model of collaborative management. The public has come to expect this seamless management of the Elkhorn Mountains and generally expects that management across the ecosystem favors wildlife. The public generally does not realize that the BLM, Butte Field Office, has a separate multiple-use plan for the Elkhorn Mountains. The relevant fish and wildlife values, as recognized by the MOU, also represent a unique wildlife management unit of national priority (Importance Criteria 3).

The Elkhorn Mountains' expansive big game winter range on public land is unique. The pure native westslope cutthroat trout also are unique, fragile, sensitive, rare, threatened, and vulnerable (Importance Criteria 2). Muskrat and Dutchman Creeks are unique because of these pure native westslope cutthroat trout. Pure strains of westslope cutthroat trout are found in only four streams of the Elkhorn Mountains, and two of these streams occur on BLM lands. Streams with westslope cutthroat trout are rare in the Elkhorn Mountains and are threatened by nonnative species and habitat degradation.

Findings

This area meets both the relevance and importance criteria and will be carried forward as a potential ACEC.

5.2 Jerry Johnson Creek

This area was formerly located within the BLM Dillon Field Office. The Dillon Management Framework Plan (BLM 1979) recommended that 15 areas, including Jerry Johnson Creek, be considered further for ACEC designation once guidance was available to conduct the evaluations. The BLM guidance finalized the process for identification and evaluation of ACECs in the 1980s, but a Dillon Management Framework Plan amendment was never completed for the 15 nominations. Because the area is now within the Butte Field Office boundary, it is being evaluated during the Butte RMP process. The nominated area is shown in Figure 2.

Description of Area/Nomination

This approximate 12,100-acre area in Silver Bow County includes BLM-administered lands adjacent to the north side of the Big Hole River from the town of Divide west about 2.5 miles to the Silver Bow-Deerlodge County line. Approximately 200 elk and 300 deer use the area for winter range.

Relevance Criteria

This nomination meets Relevance Criteria 2 for a fish and wildlife resource, because the winter range is necessary to maintain existing populations of deer and elk, and there is habitat for threatened and endangered species, including:

- Federally listed as threatened Canada lynx (*Lynx canadensis*);
- Federally listed as threatened grizzly bear (*Ursus arctos horribilis*); and
- Federally listed as endangered and experimental population gray wolf (*Canis lupus*).

Importance Criteria

The small area does not meet the importance criteria for a fish and wildlife resource. Though it contains threatened and endangered species habitat, there is nothing more than locally significant about this area, as these species occur elsewhere in Montana.

Findings

This nomination meets the relevance criteria for a fish and wildlife resource but does not meet importance criteria. As such, it will not be carried forward as a potential ACEC.

5.3 City of Butte Big Hole River Diversion

This external nomination was made during the public scoping process for the Dillon RMP in 2001. Because it is located in the Butte Field Office, it was not considered in the Dillon ACEC evaluation. The nominated area is shown in **Figure 2**.

Description of Area/Nomination

The City of Butte Big Hole River Diversion is on the Big Hole River one mile west of the town of Divide, in Silver Bow County. This nomination stated that all municipal watersheds should be considered as ACECs because they have immediate and important effects to humans. The description of this nomination was not adequate to determine exact locations or total acres of public lands. The nominator did not participate in the Butte RMP scoping process, so additional information was not solicited.

Relevance Criteria

This nomination does not meet any of the four relevance criteria. The municipal watershed does not have significant historic or cultural value (Relevance Criteria 1).

Importance Criteria

The importance criteria were not reviewed because the relevance criteria were not met.

Findings

This nomination does not meet any relevance criteria and will not be carried forward as a potential ACEC.

5.4 Soap Gulch-Camp Creek

This external nomination was made during the public scoping process for the Dillon RMP in 2001. The area is split between the Butte and Dillon Field Offices. The Dillon ACEC evaluation considered portions on Dillon Field Office lands. The nominated area is shown in **Figure 2**.

Description of Area/Nomination

This habitat area is split between the Butte and Dillon Field Offices and is north/northeast of the town of Melrose in Silver Bow County. The nominated area in the Butte Field Office totals about 9,300 acres. Bighorn sheep (*Ovis canadensis*) were reintroduced into historic habitat around Camp Creek in the mid-1960s and served as the basis for the Soap Gulch ACEC nomination in the 1979 Dillon Management Framework Plan (BLM 1979). The bighorn sheep population has expanded to occupy suitable habitat around this core area, including lands west of the Big Hole River (Melrose-Maiden Rock ACEC nomination in the Dillon RMP).

Wildlife viewing is a major regional interest with bighorn sheep seasonally present along Interstate 15 and the Big Hole River. A major die-off decimated this herd in 1995, but small bands of bighorn sheep have persisted throughout the previously occupied habitat, and a supplemental reintroduction was made in 2001. Current distribution of bighorn sheep exceeds the original core habitat area. No overall habitat management plan is in place.

Relevance Criteria

This nomination meets the Relevance Criteria 2 for a fish and wildlife resource. Bighorn sheep is a priority species for the BLM and occur in these areas.

Importance Criteria

This habitat area does not meet the importance criteria for a fish and wildlife resource. It does not have more than locally significant qualities or circumstances, as there are over 40 herds of bighorn sheep in Montana and many others in the western US. The nominated areas are not more or less important than other bighorn sheep areas in Montana or the Intermountain West. Bighorn sheep are susceptible to adverse change, but the habitats in the nominated area are not susceptible to these changes. The area is not considered fragile, nor has it been recognized as warranting special protection under the importance criteria.

Findings

This nomination meets the relevance criteria for a fish and wildlife resource but does not meet the importance criteria. Therefore, this nomination will not be carried forward as a potential ACEC.

5.5 High Ore Creek

This external nomination was made during the Butte RMP public scoping process in 2004. High Ore Creek is shown in **Figure 2**.

Description of Area/Nomination

The nomination stated that this area on High Ore Creek, west of the Boulder River in Jefferson County, should be considered for ACEC designation based on post-placer mining restoration that has significantly enhanced the water quality, aquatic integrity, and conservation value of this tributary. The potential to restore the High Ore Creek's native fishery provides another reason to consider ACEC protection. The exact location and size of the nominated area was not included in the nomination so is not known.

Relevance Criteria

This nomination does not meet any of the four relevance criteria. This is a mining reclamation area that is not part of the natural process (Relevance Criteria 3). While the condition of many of the historic properties is exceptional (Relevance Criteria 1), those resources are located on private land, and ACECs may only be considered on BLM-managed lands. The historic mining features on BLM-managed land are abandoned mine openings and ditches, and those site types are very common in the area. As such, the BLM-managed lands do not meet any relevance criteria.

Importance Criteria

The importance criteria were not reviewed because the relevance criteria were not met.

Findings

This nomination does not meet any relevance criteria and will not be carried forward as a potential ACEC.

5.6 Sleeping Giant ACEC (Existing Designation)

The Sleeping Giant ACEC (**Figure 4**) was designated an ACEC in the Headwaters RMP Record of Decision in 1984 (BLM 1984). The Sleeping Giant ACEC Management Plan (BLM 1988b) directs that the area is managed for the values for which it was designated. It is being reevaluated now because BLM regulations require reconsideration of existing ACECs during the RMP revision process (BLM 1988a).

Description of Area/Nomination

The 11,609-acre Sleeping Giant ACEC is adjacent to the Holter Lake Recreation Area complex, about 30 miles north of Helena in Lewis and Clark County. The ACEC is mostly comprised of the Sleeping Giant WSA and Sheep Creek WSA. The ACEC has steep irregular topography, with elevations ranging from 3,600 to 6,800 feet. About half the area is forested with mixed conifers, including Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), limber pine (*Pinus flexilis*), and lodgepole pine (*Pinus contorta*). Cottonwood trees (*Populus* spp.) and deciduous shrubs are associated with numerous riparian areas within the ACEC. The nonforested portions are composed of sedimentary rock ledges, talus slopes, and native grasslands. Twenty drainages dissect the area. Watershed values are high, and there are six important perennial streams.

Relevance Criteria

This area meets Relevance Criteria 1 for significant scenic values and Relevance Criteria 2 for a fish and wildlife resource. The most outstanding features or landmark in the ACEC is the Sleeping Giant, a formation created by the profile of the Beartooth Mountain and the rock outcroppings of the lower ridgeline that extend toward the Missouri River. The Sleeping Giant is a well-known landmark visible from the city of Helena.

The overall terrain is highly natural, providing outstanding scenic values. Off-site vistas of the surrounding landscape also are outstanding. Seven miles of ridgeline hiking routes offer panoramic views of the Rocky Mountains. The nationally significant Lewis and Clark National Historic Trail traverses the area. Recreation opportunities are diverse and include fishing, camping, hiking, horse travel, hunting, nature study, photography, and snowshoeing. There is an abandoned homestead, consisting of a cabin, framed house, barn, outhouse, shed, and root cellar, in the area. Another important value includes 11 miles of Holter Lake/Missouri River shoreline (BLM 1991, 2004).

Important wildlife species include bighorn sheep, mountain goat, elk, American black bear (*Ursus americanus*), mule deer, furbearers, coldwater fisheries (particularly trout [*Oncorhynchus* spp.]), Canada goose (*Branta canadensis*), osprey (*Pandion haliaetus*), the federally listed as threatened grizzly bear, and the federally listed as threatened bald eagle (*Haliaeetus leucocephalus*).

Importance Criteria

This area meets Importance Criteria 1 for scenic values and a fish and wildlife resource because the values have more than locally significant qualities that give the area special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resources. Also, the area meets Importance Criteria 2 for both relevant values because the values have qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.

Findings

This nomination continues to meet the relevance and importance criteria and will be carried forward as a potential ACEC.

5.7 Sleeping Giant ACEC Extension

This external nomination was made during the Butte RMP public scoping process in 2004. The nominated area is shown in **Figure 2**.

Description of Area/Nomination

The nomination stated that the proposed Sleeping Giant Extension ACEC is at the west end of the existing Sleeping Giant ACEC on both sides of Interstate 15. It includes BLM lands in Sections 21, 22, 23, 26, 27, 28, 29, 31, 32, 33, 34, and 35 of Township 14 North, Range 4 West; and Sections 2, 3, 4, 5, 10, 11, 12, and 13 of Township 13 North, Range 4 West, and Section 18 of Township 13 North, Range 3 West, Montana Principal Meridian, Lewis and Clark County. The site is composed of approximately 8,000 acres within a diverse landscape of ridges, hills, grasslands, and aspen-sagebrush mosaics. The area includes Little Prickly Pear Creek and several hiking trails, logging roads, and all-terrain vehicle trails.

Relevance Criteria

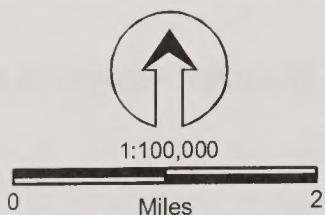
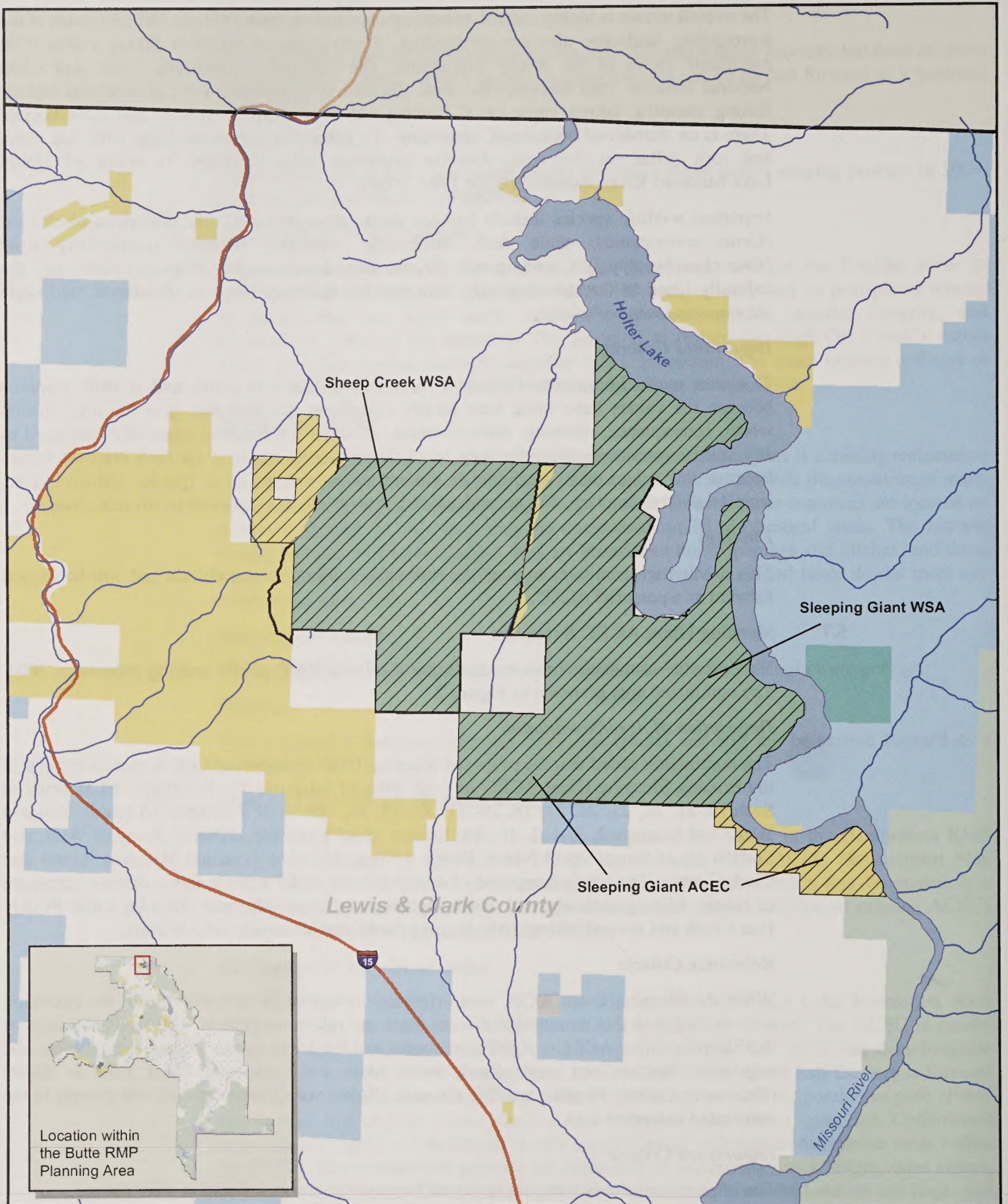
When the Sleeping Giant ACEC was originally evaluated in the early 1980s, the extension areas included in this nomination did not meet any relevance criteria. The relevant values of the Sleeping Giant ACEC – significant scenic and historical values (unique topographic and vegetation features and stage coach travel route and ford from Great Falls to Butte) (Relevance Criteria 1) and a wildlife resource (Relevance Criteria 2) – are not present in the nominated extension area.

Importance Criteria

The importance criteria were not reviewed because the relevance criteria were not met.

Findings

This nomination does not meet any of the relevance criteria so will not be carried forward as a potential ACEC.



No warranty is made by the Bureau of Land Management (BLM) for use of data for purposes not intended by BLM.

- | | |
|---|---------------------------------------|
| Wilderness Study Area (WSA) | Bureau of Land Management (BLM) Lands |
| Potential Area of Critical Environmental Concern (ACEC) | Bureau of Reclamation (BOR) Lands |
| Butte Field Office Planning Area Boundary | Private Lands |
| Rivers and Streams | State of Montana Lands |
| Interstates | USDA Forest Service Lands |
| Roads | USDI Fish and Wildlife Service Lands |
| County Boundaries | |

FIGURE 4

Location of Existing Area of Critical Environmental Concern
Sleeping Giant
BLM, Butte Field Office
Butte RMP and EIS

5.8 Spokane Creek

This internal nomination made by BLM specialists is depicted in **Figure 5**.

Description of Area/Nomination

This area is part of the McMaster Ranch acquisition that was facilitated by The Conservation Fund and purchased by the BLM in 2004 with Land and Water Conservation Funds. The approximately 14-acre area is located on BLM-managed lands along Hauser Lake in Sections 4 and 5, Township 7 North, Range 4 West, Montana Principal Meridian, Lewis and Clark County (Figure 5).

The area is comprised of two converging perennial reaches of Spokane Creek and a diverse composition of riparian vegetation. It is immediately downstream of a 120-acre private parcel that is under a conservation easement. The Conservation Fund, and ultimately the BLM, has first right of purchase for the privately owned parcel if the private owners decide to sell in the future. Within the conservation easement, there are several large springs that contribute the majority of the stream flows through the nominated area. The BLM has been entrusted to manage the conservation easement and its water resources to maintain or enhance its natural values. Partnerships are currently underway to protect this important resource.

Relevance Criteria

The natural characteristics of the nominated Spokane Creek area meet Relevance Criteria 2 and 3. The area provides essential habitat for maintaining both plant and animal diversity (Relevance Criteria 2). The aquatic and riparian plant communities provide a natural functioning system (Relevance Criteria 3).

Importance Criteria

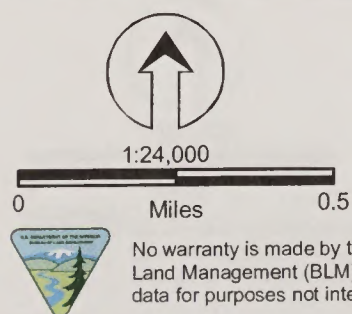
The relevant resource values are substantially significant and meet Importance Criteria 1, 2, and 3. Spokane Creek and its associated riparian vegetation, which provide a natural functioning system, present more than locally significant qualities of special worth, distinctiveness, and cause for concern (Importance Criteria 1). It is critically important as a natural spawning stream for three key sport fish species (brown trout [*Salmo trutta*], rainbow trout [*Oncorhynchus mykiss*] and Kokanee salmon [*Oncorhynchus nerka kennerlyi*]) in Hauser Lake and the Missouri River that attract anglers throughout Montana and the US. This important spawning stream also provides food sources for the federally listed as threatened bald eagle.

The relevant values are sensitive, rare, irreplaceable, unique, and vulnerable, which makes them worthy of special management and protection (Importance Criteria 2). These qualities are a result of Spokane Creek being the only properly functioning perennial, spawning stream that flows into Hauser Lake. The stream is primarily spring fed, has high water quality, maintains consistently cool temperatures, and provides excellent yearlong spawning habitat because of its abundant gravel bars, overhanging banks, and vegetative shading. In addition to its unique qualities for sustaining fisheries on Hauser Lake and the Missouri River, this nominated area provides habitat for bald eagle, osprey, and numerous species of waterfowl, and excellent opportunities for wildlife observation and nature study.

The FLPMA mandates that important fish and wildlife resources be protected through special management attention that ACEC designations provide (Importance Criteria 3).

Findings

This nomination meets the relevance and importance criteria and will be carried forward as a potential ACEC.



- | | |
|---|---------------------------------------|
| Wilderness Study Area (WSA) | Bureau of Land Management (BLM) Lands |
| Potential Area of Critical Environmental Concern (ACEC) | Bureau of Reclamation (BOR) Lands |
| Butte Field Office Planning Area Boundary | Private Lands |
| Rivers and Streams | State of Montana Lands |
| Interstates | USDA Forest Service Lands |
| Roads | USDI Fish and Wildlife Service Lands |
| County Boundaries | |

FIGURE 5

Location of Potential Area of Critical Environmental Concern
Spokane Creek
BLM, Butte Field Office
Butte RMP and EIS

5.9 Ringing Rocks

This internal nomination made by BLM specialists is depicted in **Figure 6**.

Description of Area/Nomination

The Ringing Rocks are located approximately four miles northeast of the town of Pipestone and Interstate 90. The nominated ACEC is about 160 acres of BLM-administered lands in Section 9, Township 2 North, Range 5 West, Montana Principal Meridian, Jefferson County. The ACEC encompasses an approximate one-acre open outcrop of weathered monzonite with a wide range of weathered boulders. These weathered blocks range from 3 to 13 feet. The rocks ring with bell-like tones when struck lightly with a stout stick or rock hammer. The rocks only ring in outcrop; hand samples broken off will not ring.

Relevance Criteria

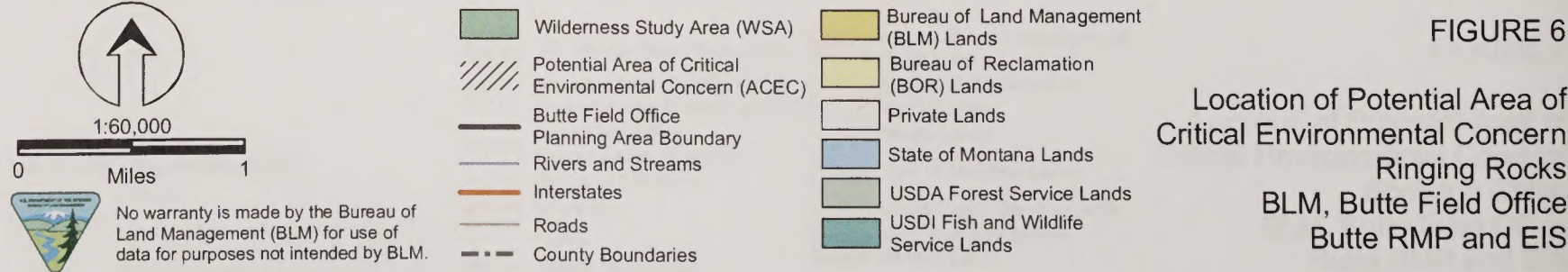
This area meets Relevance Criteria 3 for a rare geological feature. Ringing rocks are reportedly found throughout the world, but they are not common. The only other site where ringing rocks are found in the US is in Bucks County, Pennsylvania.

Importance Criteria

The geologic feature meets Importance Criteria 1 (more than locally significant distinctive geological feature) and 2 (rare and unique geological feature). The Ringing Rocks site is one of only two known sites in the continental US where rocks ring when struck, thus making this an extremely rare occurrence.

Findings

This nomination meets the relevance and importance criteria and will be carried forward as a potential ACEC.



5.10 Humbug Spires ACEC Nomination

This internal nomination by BLM specialists is depicted in Figure 7.

Description of Area/Nomination

This potential ACEC includes the majority of both the Humbug Spires original Primitive Area designated in 1972 and the recommended wilderness Instant Study Area that was finalized in 1981. The potential ACEC totals about 8,400 acres of public land. The area is located in Silver Bow County in southwestern Montana, approximately 15 miles south of Butte and four miles east of Divide and Interstate 15. The area is accessible from I-15 via a primitive road from the Divide interchange and an improved gravel road from the Moose Creek interchange that leads to a developed trailhead.

The Humbug Spires potential ACEC is a highly natural and pristine area. The majority of the area is forested with dense stands of Douglas-fir and lodgepole pine. Small areas of old growth Douglas-fir trees exist within numerous drainage bottoms. Riparian areas of willows, dogwood, alder, aspen, and cottonwoods are scattered throughout the streams and upper tributaries. The topography is extremely diverse with numerous ridges and dissecting drainages. Geologically, there are hundreds of large granite spires throughout the area. About ten of these light gray spires are between 300 and 600 feet tall. Moose Creek is the primary perennial stream bisecting the area. Moose Creek supports small populations of brook, rainbow, and cutthroat trout. Important big-game species include elk, mule deer, black bear, moose, and bighorn sheep. Other wildlife species common to the area are mountain lion, coyote, fox, weasel, bobcat, beaver, squirrels, rabbits, grouse, and several species of raptors.

Relevance Criteria

The natural characteristics of the Humbug Spires area meet Relevance criteria 1, 2, and 3. The natural and diverse topography, vegetation, streams, and rock spires of the area provide outstanding scenic values that are significant. The Visual Resource Management Classification of this area is Class 1 which is highest and most protective BLM rating possible. These characteristics meet Criterion 1.

The area provides essential habitat for maintaining both plant and animal diversity, thus meeting relevance criterion 2. In addition the area provides active habitat for the following Threatened/Endangered/Sensitive species: Canada lynx, bald eagle, Northern goshawk, peregrine falcon, black-backed woodpecker, three-toed woodpecker, Townsend's big-eared bat, fringed myotis, long-legged myotis and the long-eared myotis.

The aquatic and riparian plant communities associated with Moose Creek and its upper tributaries provide a natural functioning system. Sensitive plant species found within the area include Idaho sedge and Sapphire rockcress. These features meet relevance Criterion 3.

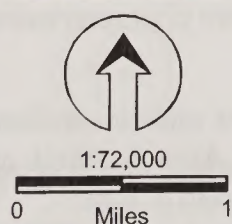
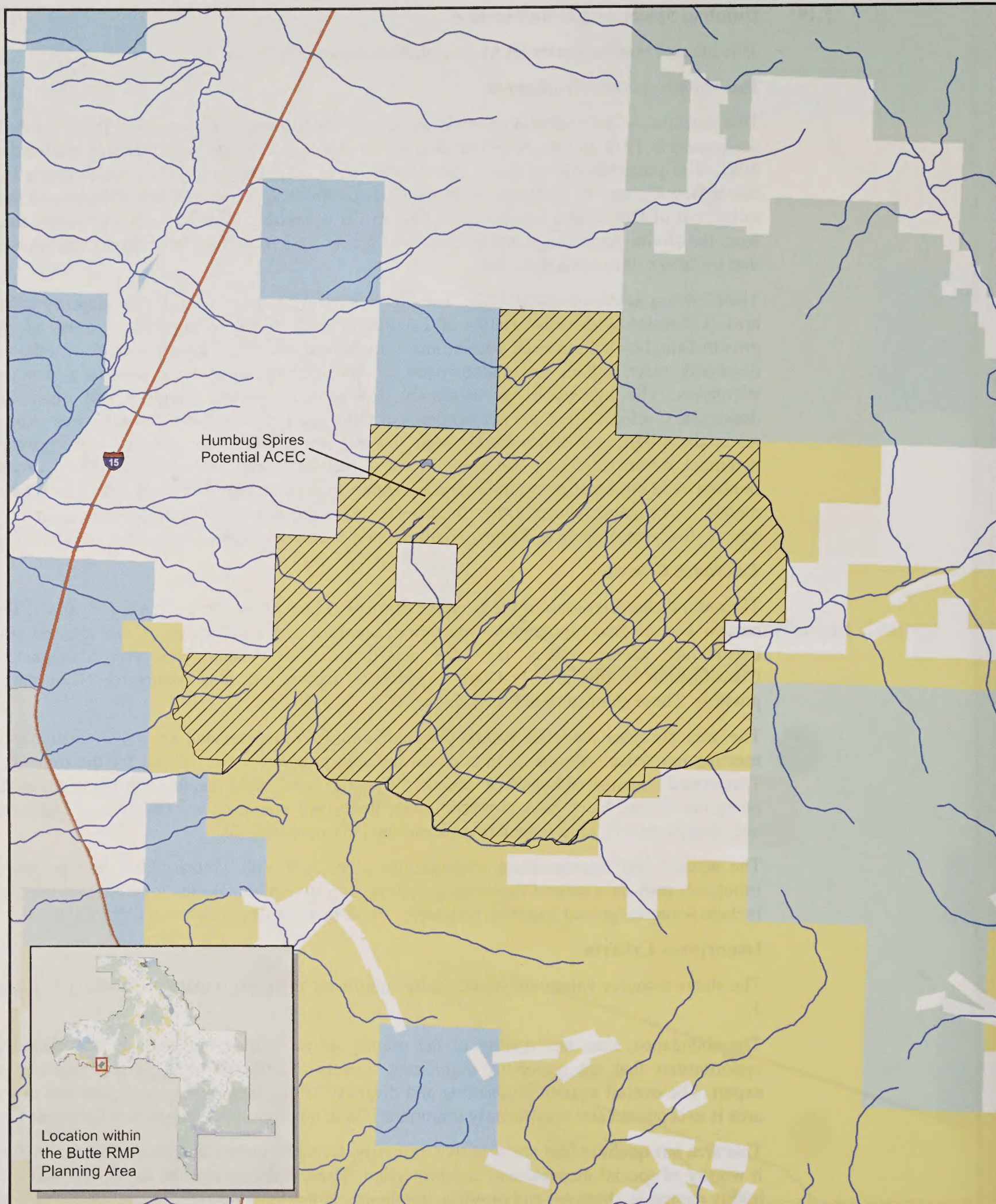
Importance Criteria

The above resource values are substantially significant and meet Importance Criteria 1, 2, and 3.

The abundance, size, and quality of the granite spires provide outstanding rock climbing opportunities that are regionally significant. Levels of difficulty range from beginner to expert. The overall availability, setting and diversity of climbing experiences provided in the area is exceptional and significantly important. These qualities meet importance Criterion 1.

This area has qualities that are sensitive, rare, irreplaceable, unique and vulnerable that makes it worthy of special management and protection. These qualities are due to the fact that it is highly natural in character and provides important habitat for several big-game species as well as Threatened/Endangered/Sensitive species of both plants and animals. These characteristics meet importance Criterion 2.

Due to the outstanding qualities of scenery, naturalness, solitude and primitive and unconfined recreation opportunities the area has been both designated as a Primitive Area as well as recommended for Wilderness designation. These qualities meet importance Criterion 3.



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- Potential Area of Critical Environmental Concern (ACEC)
- Butte Field Office Planning Area Boundary
- Rivers and Streams
- Interstates
- Roads
- County Boundaries

- Bureau of Land Management (BLM) Lands
- Bureau of Reclamation (BOR) Lands
- Private Lands
- State of Montana Lands
- USDA Forest Service Lands
- USDI Fish and Wildlife Service Lands

FIGURE 7

Location of Potential Area of
Critical Environmental Concern
Humbug Spires
BLM, Butte Field Office
Butte RMP and EIS

6. SUMMARY AND CONCLUSIONS

A total of ten nominated areas and existing ACECs were evaluated. These included five external nominations (made by other agencies or the public), three internal nominations (made by BLM specialists), one recommendation from the Dillon Management Framework Plan (BLM 1979), and one existing ACEC. Five areas totaling approximately 87,700 acres meet the relevance and importance criteria and will be carried forward as potential ACECs (Table 1).

Various alternatives in the Draft RMP will recommend the areas for designation as ACECs (or continued designation in the case of Sleeping Giant ACEC) if special management is required to protect the relevant and important values. Areas found not to meet the relevance and importance criteria are not being carried forward as potential ACECs.

Table 1
Potential Areas of Critical Environmental Concern

Potential ACEC	Size (acres)	Relevance Criteria Met	Importance Criteria Met
Elkhorn Mountains	67,500	1, 2	1, 2, 3
Sleeping Giant ACEC (existing designation)	11,609	1, 2	1, 2
Spokane Creek	14	2, 3	1, 2, 3
Ringing Rocks	160	3	1, 2
Humbug Spires	8,400	1, 2, 3	1, 2, 3

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- _____. 1984. Headwaters Resource Area Resource Management Plan/Environmental Impact Statement, Butte District, Montana. BLM, Butte District, Montana.
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- _____. 2004. Montana Westside Recreation Sites, BLM Recreation Sites in western Montana. Internet Web site: <http://www.mt.blm.gov/bdo/pages/recsites.html>. Accessed on March 26 and May 6, 2004.
- Federal Register. 2003. Notice of Intent To Prepare a Resource Management Plan for the Butte Field Office and Associated Environmental Impact Statement. Vol. 68, No. 244, page 70833. December 19, 2003.

GLOSSARY

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area established through the planning process, as provided in FLPMA, where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values; or to fish and wildlife resources or other natural systems or processes; or to protect life and afford safety from natural hazards.

IDENTIFICATION CRITERIA. To be considered as a potential ACEC and analyzed in RMP alternatives, an area must meet the criteria of relevance and importance, as established and defined in 43 CFR 1610.7-2.

RELEVANCE. An area meets the relevance criterion if it contains one or more of the following:

1. A significant historic, cultural, or scenic value (including but not limited to rare or sensitive archeological resources and religious or cultural resources important to native Americans);
2. A fish and wildlife resource (including but not limited to habitat for endangered, sensitive, or threatened species, or habitat essential for maintaining species diversity);
3. A natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relict plants or plant communities that are terrestrial, aquatic, or riparian; or rare geological features); and/or
4. Natural hazards (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the RMP process that it has become part of a natural process.

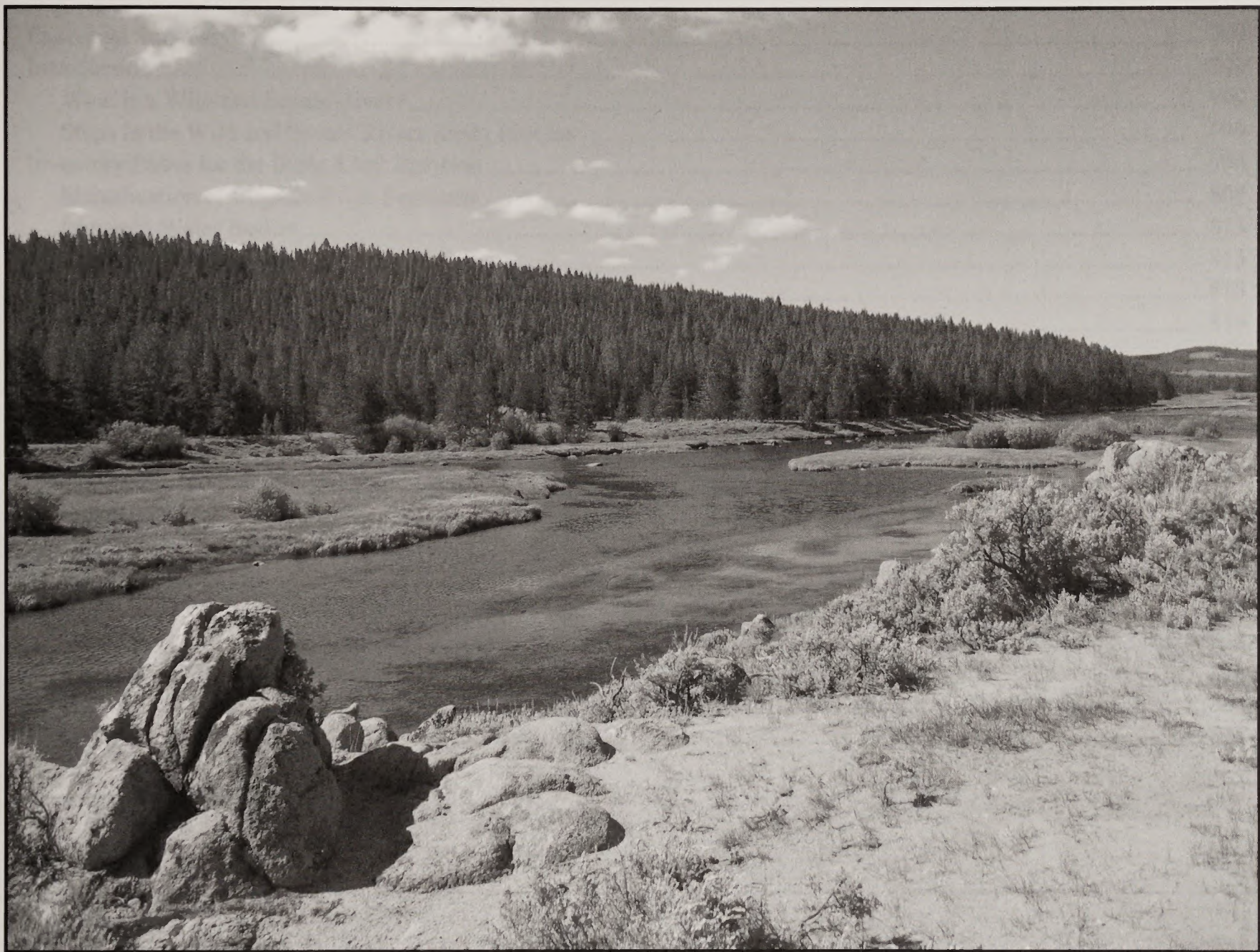
IMPORTANCE. The value, resource, system, process, or hazard described above must have substantial significance and values in order to satisfy the importance criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

1. Has more than locally significant qualities that give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource;
2. Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change;
3. Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA;
4. Has qualities that warrant highlighting in order to satisfy public or management concerns about safety and public welfare; and/or
5. Poses a significant threat to human life and safety or to property.

PLANNING AREA. The geographical area for which land use and resource management plans are developed and maintained.

RESOURCE MANAGEMENT PLAN (RMP). A land use plan that establishes land use allocations, multiple-use guidelines, and management objectives for a given planning area. The BLM has used the RMP planning system since about 1980.

APPENDIX I – DRAFT REPORT ON WILD AND SCENIC RIVERS ELIGIBILITY & SUITABILITY DETERMINATIONS



Upper Big Hole River, Deer Lodge County, Montana

BUTTE RESOURCE MANAGEMENT PLAN BUTTE FIELD OFFICE, MONTANA

February 2006



US Department of Interior, Bureau of Land Management
106 North Parkmont
Butte, Montana 59701

APPENDIX 1 - DRAFT REPORT ON WILD AND SCENIC RIVERS
ELIGIBILITY & SUSTAINABILITY DETERMINATIONS



Figure 1-1: Map of the River

RIVER HISTORY MANAGEMENT PLAN
RIVER FIELD OFFICE, MONTANA

February 2006



U.S. Department of the Interior, Bureau of Land Management
100 North Park
Butte, Montana 59701

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LIST OF ACRONYMS

Acronym or Abbreviation	Full Phrase
BLM	United States Department of the Interior, Bureau of Land Management
EA	environmental assessment
EIS	environmental impact statement
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
GIS	Geographic Information System
IM	Instruction Memorandum
MFWP	Montana Fish, Wildlife, and Parks
MDEQ	Montana Department of Environmental Quality
MOU	Memorandum of Understanding
NPS	United States Department of the Interior, National Park Service
NWSRS	National Wild and Scenic Rivers System
Planning Area	Butte Resource Management Plan planning area
PPL	Pennsylvania Power and Light Corporation
RMA	Recreation Management Area
RMP	resource management plan
TMDL	total maximum daily load
USC	United States Code
USFS	United States Department of Agriculture, Forest Service
VRM	Visual Resource Management
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WSR Act	Wild and Scenic Rivers Act

DRAFT WILD AND SCENIC RIVER ELIGIBILITY & SUITABILITY DETERMINATIONS

EXECUTIVE SUMMARY

As part of the land use planning process for the Butte Resource Management Plan (RMP), a US Department of the Interior, Bureau of Land Management (BLM) interdisciplinary team analyzed all river and stream segments in the Butte Field Office administrative area (Planning Area) that might be eligible for inclusion in the National Wild and Scenic Rivers System (NWSRS). This included screening all Planning Area rivers to identify those with BLM surface ownership. These initial screening and identification efforts resulted in a list of 164 rivers or river segments for further consideration in the inventory process.

Additional review focused on whether these 164 segments meet free-flowing criteria and contain any outstandingly remarkable values, as defined in the Wild and Scenic Rivers Act of 1968 (Public Law 90-542 [as amended], 16 United States Code 1271-1287) (WSR Act). Of the 164 river segments, four segments totaling 12 miles meet the eligibility criteria. These include segments on the Big Hole River, Missouri River, Moose Creek, and Muskrat Creek. Tentative classifications are assigned to each eligible segment as follows: Big Hole River – Recreational; Missouri River – Scenic; Moose Creek – Scenic; and Muskrat Creek – Scenic.

INTRODUCTION

Section 5(d)(1) of the WSR Act directs Federal agencies to consider potential wild and scenic rivers in their land and water planning processes (*"In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas"*). To fulfill this requirement, whenever the BLM undertakes a land use planning effort (e.g., an RMP), it analyzes river and stream segments that might be eligible for inclusion in the NWSRS. The BLM, Butte Field Office, is revising its older land use plans, namely the Headwaters RMP (BLM 1984) and the Dillon Management Framework Plan (BLM 1979). The revised RMP will provide a single, comprehensive land use plan that will guide management of public land administered by the Butte Field Office.

This report is a record of the wild and scenic river study that is being conducted concurrently with the Butte RMP revision. This report documents BLM's examination of Butte Field Office river segments as they relate to eligibility, suitability, and classification criteria in the WSR Act.

The BLM Butte Field Office Planning Area is in mid-western Montana (**Figure 1**). Within the Planning Area, BLM administers about 311,000 acres of public surface land and 656,000 acres of Federal mineral estate in Lewis and Clark, Jefferson, Broadwater, Deer Lodge, Silver Bow, Gallatin, and Park Counties.

WHAT IS A WILD AND SCENIC RIVER?

Congress enacted the WSR Act to provide a national policy for preserving and protecting selected rivers and river segments in their free-flowing condition for the benefit and enjoyment of present and future generations. The WSR Act provides criteria that must be considered during the analysis. The eligibility process is depicted in **Figure 2**. No rivers in the Planning Area are currently managed under the WSR Act.

STEPS IN THE WILD AND SCENIC RIVERS STUDY PROCESS

The wild and scenic river study process is comprised of two main components: the inventory phase and the study phase. The inventory phase includes identifying eligible river and stream segments, assigning tentative classification (Wild, Scenic, or Recreational), and describing protective management for the eligible segments. The study phase includes determining the suitability of eligible segments for inclusion in the NWSRS and describing interim management measures. The inventory is conducted during the data-gathering stage of RMP revision, and the study phase is done during formulation of the Draft RMP and Proposed RMP.

Inventory Phase

The purpose of the inventory is to identify eligible rivers and river segments in the Planning Area and to assign them a tentative classification. The WSR Act directs agencies to consider a wide variety of internal and external sources to identify potentially eligible rivers. The goal is to avoid overlooking river segments that could be included in the NWSRS. In cases where a particular river segment is predominantly non-Federal in ownership and contains interspersed BLM-administered lands, BLM shall evaluate only its segment as to eligibility and defer to the state or private landowners' discretion as to their determination of eligibility (BLM 2003).

Identification of Eligible River Segments

The BLM applies standard criteria to identified river segments to determine eligibility. To be eligible, a river segment must be free-flowing and must possess at least one river-related value considered outstandingly remarkable. The specific criteria for free-flowing and outstandingly remarkable values are listed in Appendix A.

There are several sources generally used to identify potentially eligible rivers, as follows:

- *The Outstanding Rivers List* (Huntington and Echeverria 1991). This was compiled by the American Rivers Organization as a comprehensive nationwide compilation of rivers that possess some outstanding ecological, recreational, natural, cultural, or scenic values. Rivers protected by legislation and rivers currently unprotected are included. The list includes more than 15,000 outstanding United States river segments, roughly 300,000 river miles. Some of this information is redundant with the Nationwide Rivers Inventory, which is included within the Outstanding Rivers List, but much of it is additional information.
- *The Nationwide Rivers Inventory* (NPS 2004). This inventory was initially completed in 1982 and is maintained and periodically updated by the National Park Service. Additions have been made as a result of BLM and U.S. Forest Service (USFS) inventories, done as part of their land use planning processes. It is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance.
- *Montana Fish, Wildlife, and Parks' Class One Streams List* (MWFP 2004a). This lists Class I streams, which are blue ribbon fisheries, throughout Montana.
- *The Montana Statewide Comprehensive Outdoor Recreation Plan* (MWFP 2004b). The 2003-2007 Statewide Comprehensive Outdoor Recreation Plan outlines Montana's five-year plan for outdoor recreation management, conservation, and development. It provides the strategic framework for recreation facility managers to use as a guideline in planning and prioritizing resources for staff and funding and includes a timeline for implementation.
- The USFS, Helena National Forest Wild and Scenic Rivers Eligibility Study (Helena National Forest 1989). The Helena National Forest conducted eligibility studies on some reaches that are considered in this report. Prior to 1989, segments of four streams located on Helena National Forest-administered lands were determined eligible: portions of Copper Creek, Little Blackfoot River, Beaver Creek, and the Missouri River from Hauser Dam to Cochran Gulch (Helena National Forest 2004). Helena National Forest will conduct suitability studies on these eligible reaches in the future. These include the three-mile free-flowing stretch of the Missouri River located below Hauser Dam and above Holter Lake (in the Helena National Forest), which is located in the very northern portion of the Butte Field Office; this was tentatively classified as scenic.
- *River segments identified in public scoping during the RMP revision process.* No river segments were identified by the public during the scoping process.

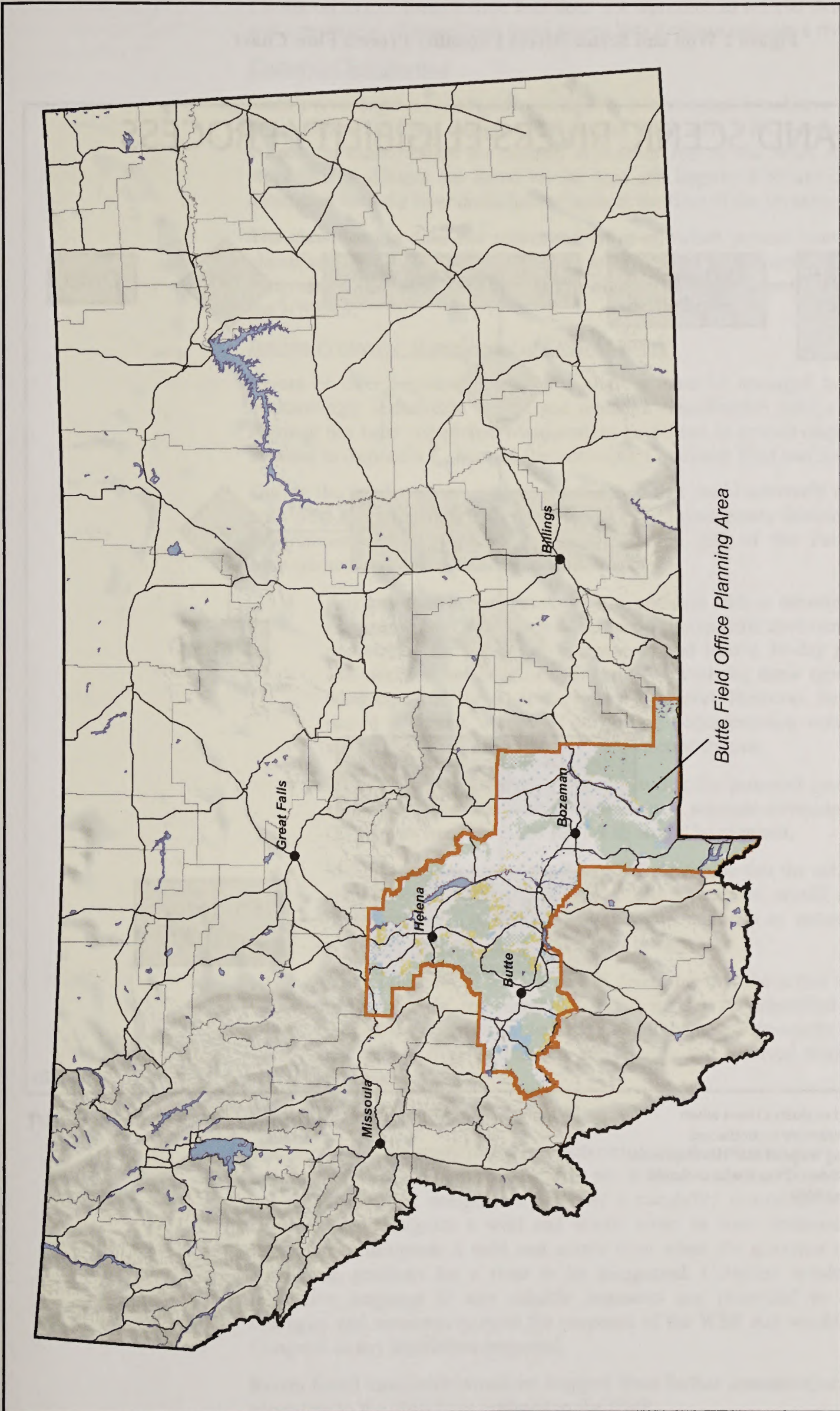
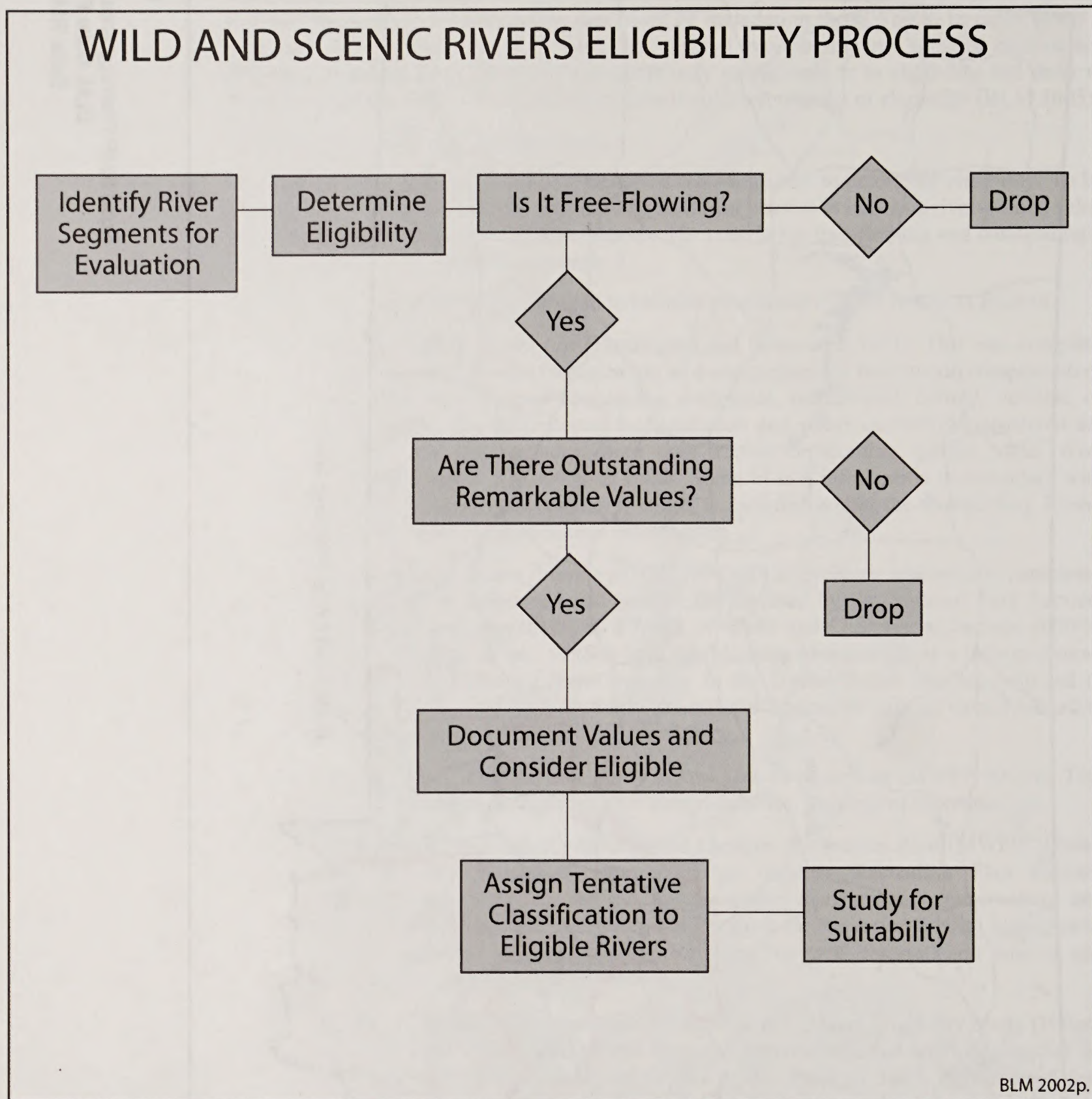


FIGURE 1
Butte RMP Planning Area, Montana
BLM, Butte Field Office
Butte RMP and EIS

Figure 2 Wild and Scenic Rivers Eligibility Process Flow Chart



The BLM inventories and evaluates rivers when it develops a RMP. The inventory is conducted during the data gathering stage of RMP development, and the study phase is done during the formulation of the Draft and Proposed RMP.

Wild and Scenic Rivers Eligibility Process Flow Chart

Listing on any of these source lists does not represent an official determination of eligibility and, conversely, absence from these source lists does not indicate a river's noneligibility.

Tentative Classification

Once a river segment is considered eligible, it is assigned a tentative classification. There are three classes for rivers designated under the WSR Act: Wild, Scenic, and Recreational. The criteria for classification are defined in Section 2(b) of the WSR Act and are described in Appendix B. Classes are based on the type and degree of human development and access associated with the river and adjacent lands at the time of the inventory.

The classification does not reflect the types of values present along a river segment. The classification assigned during the inventory phase is tentative. Final classification is a congressional legislative determination, along with designation of a river segment as part of the NWSRS.

Interim Protective Management of Eligible Rivers

Rivers or river segments determined eligible must be managed to protect the free flow, outstandingly remarkable values, and tentative classification until a suitability study of the segment has been completed. Management guidelines to protect eligible candidate rivers are detailed in Appendix C, *Interim Protection for Candidate Wild and Scenic Rivers*.

During the interim phase, any proposed action that could adversely affect or be inconsistent with wild and scenic river values would require management decisions based on a National Environmental Policy Act analysis and Section 202 of the Federal Land Policy and Management Act of 1976 (FLPMA), as follows:

- Any proposed action that may be inconsistent with or adversely affect identified wild and scenic river values would require a site-specific environmental assessment (EA), opportunity for public involvement, and at least a 30-day public comment period. The decision notice record for the EA (involving these types of actions) would be conducted and signed at the field office level. However, before the decision notice record is signed, a copy of supporting documentation would be forwarded to the applicable state director for review and concurrence.
- If the preparers of the EA determine that the proposal could have a major action significantly affecting the environment, a separate environmental impact statement (EIS) apart from the BLM RMP/EIS would be required.
- Should the preparers of the EA or EIS determine that the action as proposed, or with appropriate mitigation or an acceptable alternative, would not have irreversible or irretrievable adverse impacts and would maintain or enhance identified wild and scenic river values, such action may be approved.
- If the preparers of the EA or EIS determine that the action as proposed would have irreversible or irretrievable adverse impacts to identified wild and scenic river values, the decision on the action would be held temporarily in suspension until wild and scenic river evaluations are address and resolved through the BLM planning process.

Suitability Study Phase

The purpose of the study phase is to determine whether eligible river segments are suitable or unsuitable for inclusion in the NWSRS, per WSR Act criteria. The suitability evaluation does not result in actual designation but only a suitability determination for designation. Only Congress can designate a wild and scenic river. In some instances, the Secretary of the Interior may designate a wild and scenic river when the governor of a state, under certain conditions, petitions for a river to be designated. Congress would ultimately choose the legislative language if any suitable segments are presented to them. Water-protection strategies and measures to meet the purposes of the WSR Act would be the responsibility of Congress in any legislation proposed.

Rivers found unsuitable would be dropped from further consideration and would be managed according to the objectives outlined in the RMP.

The preliminary suitability evaluation is completed as the Draft RMP is prepared. Impacts that would occur from designation and non-designation of the eligible river segments then would be analyzed in the EIS associated with the RMP. Public review and comment on preliminary suitability determinations included in the Draft RMP/EIS would be considered before the BLM makes final suitability determinations in the proposed RMP.

Suitability Criteria

The following 13 factors, identified in BLM Manual Section 8351 (BLM 1992), are applied to each eligible river segment when completing the suitability study:

1. Characteristics that do or do not make the river a worthy addition to the NWSRS;
2. The status of land ownership, minerals, use in the area, including the amount of private land involved, and associated or incompatible uses;
3. Reasonably foreseeable potential uses of the land and related waters that would be enhanced, foreclosed, or curtailed if the area were included in the NWSRS and values that would be foreclosed or diminished if the area were not protected as part of the NWSRS;
4. Federal or state agency that will administer the river should it be added to the NWSRS;
5. Federal, state, tribal, local, public, or others with an interest in designation or non-designation of the river, including the extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state, local, or other agencies and individuals;
6. Estimated cost to the United States of acquiring necessary lands, interests in lands, and administering the area should it be added to the NWSRS;
7. A determination of the degree to which the state or its political subdivision(s) might participate in the preservation and administration of the river should it be proposed for inclusion in the NWSRS;
8. The Federal agency's ability or other mechanisms to protect and manage the identified river-related values other than designation into the NWSRS;
9. An evaluation of the adequacy of local zoning and other land use controls in protecting the river's outstandingly remarkable values by preventing incompatible development;
10. Support or opposition to designation;
11. Historical or existing rights that could be adversely affected with designation; and
12. The consistency of designation with other agency plans, programs, or policies in meeting regional objectives; and
13. The contribution to a river system, watershed, or basin integrity.

Interim Management of Suitable Segments

The WSR Act requires that interim management measures be developed to protect the free-flowing nature, outstandingly remarkable values, and recommended classification of suitable segments until Congressional action regarding designation is taken. Guidelines for interim management are included in Appendix C.

INVENTORY PHASE FOR THE BUTTE RMP REVISION

Various resource personnel from the BLM's Butte Field Office were consulted to conduct the wild and scenic rivers inventory in support of the RMP revision currently underway. The interdisciplinary team was composed of BLM staff specialists in lands and realty, wildlife/fisheries/riparian biology, range/riparian resources, recreation, visual resources, cultural resources, minerals, and geology.

IDENTIFICATION OF ELIGIBLE RIVER SEGMENTS

To avoid overlooking potentially eligible river segments, a combination of sources were used. The primary source was the BLM's geographic information system (GIS) rivers and streams layer (BLM 2004b), which is a comprehensive list of potentially free-flowing waterbodies within the Planning Area. The GIS was cross-referenced with additional sources, including the Outstanding Rivers List (Huntington and Echeverria 1991), Nationwide Rivers Inventory (NPS 2004), Montana Fish, Wildlife, and Parks' (MFWP) Class One Streams List (MFWP 2004a), and Montana Statewide Comprehensive Outdoor Recreation Plan (MFWP 2004b). The Nationwide Rivers Inventory includes two river segments on BLM-administered lands in the Planning Area: 1.06 miles of the Yellowstone River in Park County (Township 7 South, Range 7 East, Sections 19 and 20, Montana Principal Meridian) and the 3.1-mile segment of the Missouri River, between Hauser Dam and Upper Holter Lake (NPS 2004).

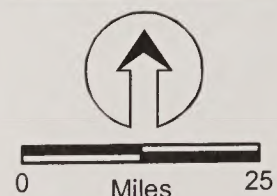
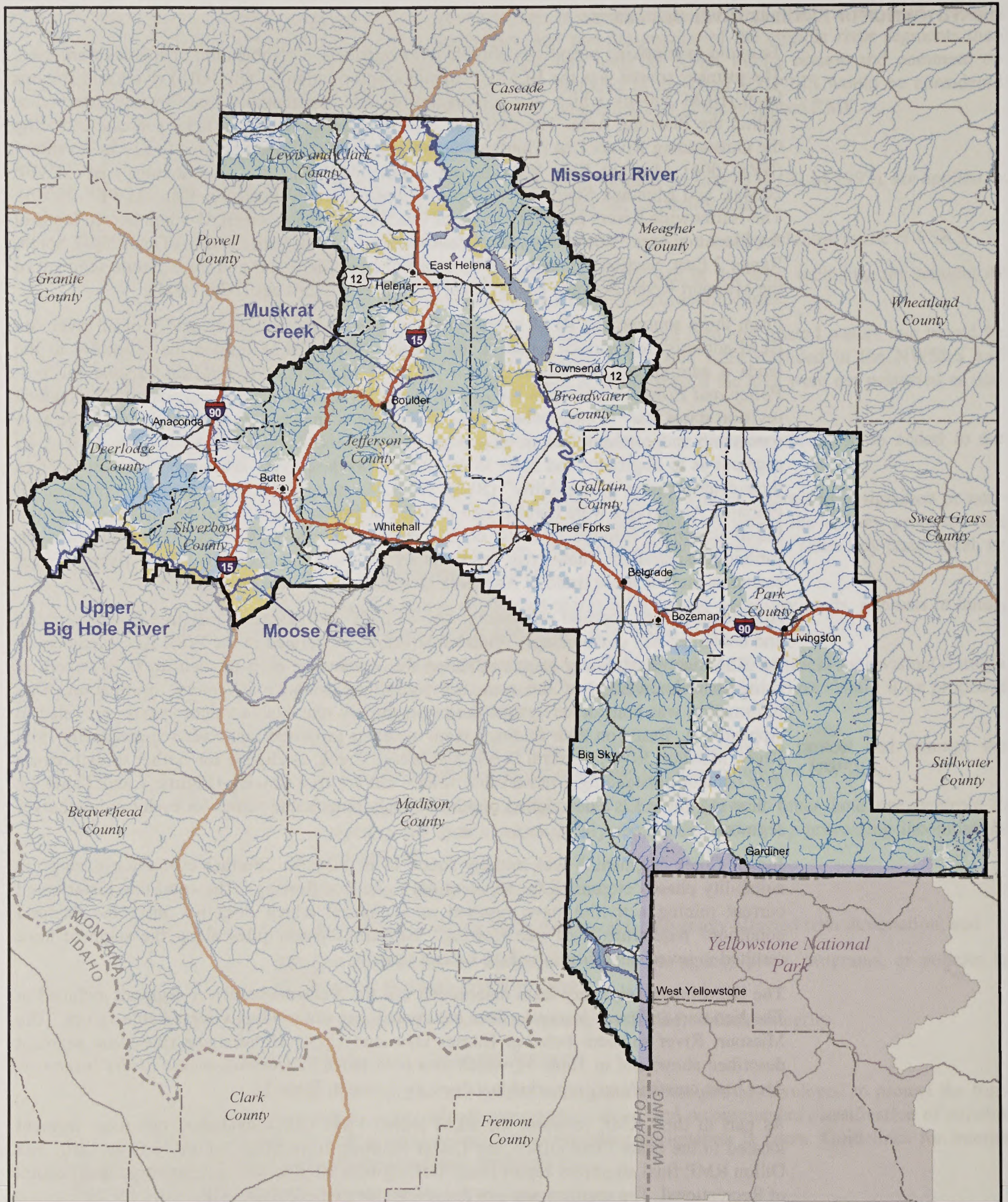
From these sources, the BLM interdisciplinary team compiled an inventory of all rivers on BLM-administered surface lands in the Planning Area. BLM limited the inventory to the lands it administers, per recent changes to BLM Manual 8351, *Wild and Scenic Rivers—Policy and Program Direction for Identification, Evaluation, and Management*. The manual revision states that “In cases where a particular river segment is predominantly non-Federal in ownership and contains interspersed BLM-administered lands, BLM shall evaluate only its segment as to eligibility and defer to the State or to the private landowners' discretion as to their determination of eligibility” (BLM 2003). As part of the initial screening process, all Planning Area rivers were divided into multiple segments based on BLM surface ownership. Initial screening resulted in a list of 164 river segments on BLM-administered lands for further consideration. These river segments are located along 55 rivers. These rivers or river segments include those listed in Appendix D which are depicted on **Figure 3**.

Additional review focused on whether any of these 164 segments met free-flowing criteria and contained any outstandingly remarkable values, as defined in the WSR Act. Members of the BLM interdisciplinary team conducted this review for each of their areas of expertise, using their knowledge of the area and consulting available inventory information. This information was considered against the outstandingly remarkable values criteria provided in Appendix A. Based on their findings, team members proposed four river segments, Big Hole River, Missouri River, Muskrat Creek, and Moose Creek, as eligible for further study because they contain outstandingly remarkable values and are free flowing (**Figure 4** and **Table 1**). Following Table 1 is a description of outstandingly remarkable values for each candidate river segment.

Indian Creek Segment 5 was initially found to be eligible. Further evaluation during the suitability phase determined the segment not to be free flowing. The extensive historic and current mining activities have resulted in a channel which does not meet the “natural condition” requirements of free flowing. Numerous placer piles along the segment have resulted in severe modification of the natural channel.

The BLM interdisciplinary team determined that the Yellowstone River segment included in *The Nationwide Rivers Inventory* does not contain any outstandingly remarkable values. The Missouri River segment between Hauser Dam and Upper Holter Lake (the same segment described above and in Table 1), which also is included in *The Nationwide Rivers Inventory*, does have outstandingly remarkable values, as shown in Table 1.

As part of their RMP revision, the BLM Dillon Field Office evaluated one river segment located in the Butte Field Office, the Lower Madison from Black's Ford to Gray Cliff. The Dillon RMP final eligibility report found this segment eligible with a temporary classification of Recreational. The segment was not found suitable in the Dillon RMP.



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- | | | |
|-------------|---------------|----------------------------|
| BLM | State | Interstates |
| BOR | Other Federal | Roads |
| Local Gov't | USFS | Rivers and Streams |
| NPS | USFWS | Rivers of Interest |
| Private | Unknown | BFO Planning Area Boundary |
| | Water | County Boundaries |
| | | State Boundaries |

FIGURE 3

Planning Area Rivers
with Eligible Segments
BLM, Butte Field Office
Butte RMP and EIS

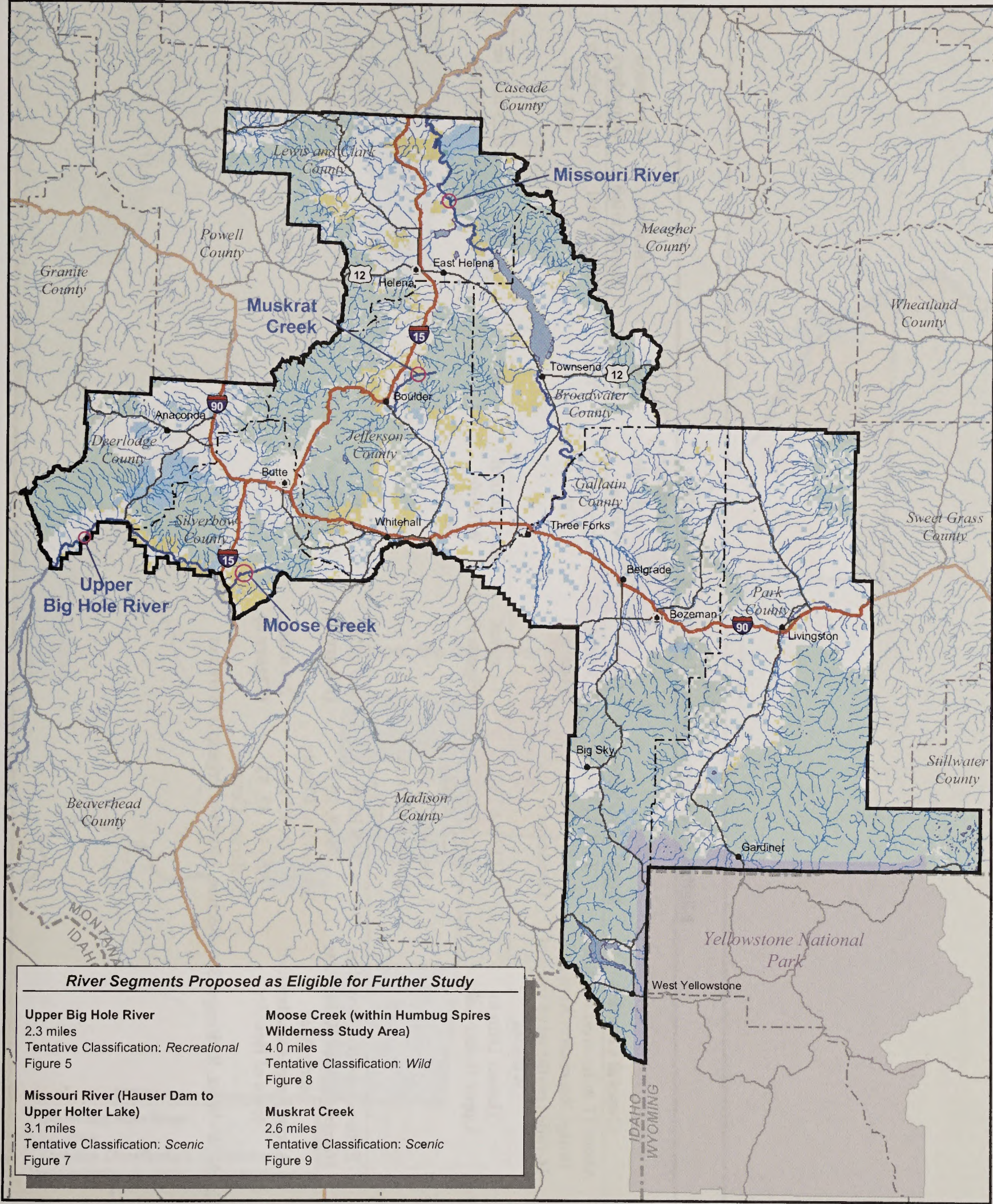


FIGURE 4

Planning Area River Segments
Proposed as Eligible for
Further Study
BLM, Butte Field Office
Butte RMP and EIS

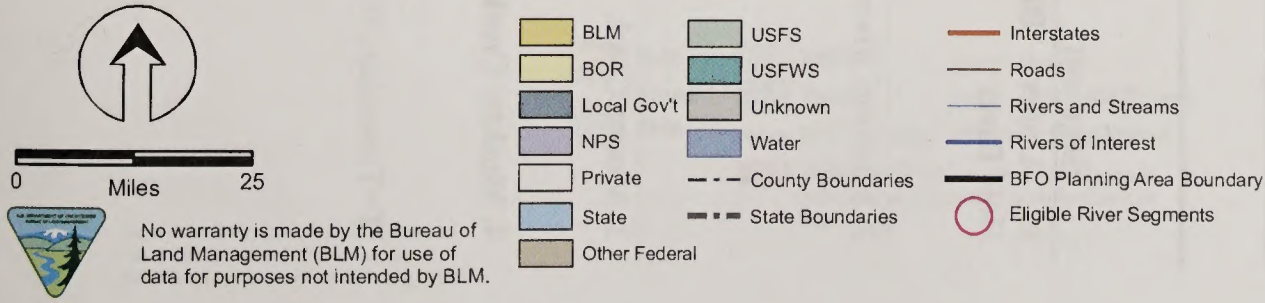


Table 1
Eligible River Segments and Tentative Classification

Segment	General Location	Legal Description ¹	Length	Outstandingly Remarkable Values	Free-Flowing?	Tentative Classification	Proposed Boundary
1. Upper Big Hole River	About 11 miles west of Dickie Bridge Recreation Area and 16 miles northeast of town of Wisdom	T1N R13W Sec 8, 17, 18, 19, Deerlodge County	2.3 miles (Figure 5)	Recreational Fish	Yes	Recreational	0.25-mile on each side
2. Missouri River	Hauser Dam to Upper Holter Lake	T12N R3W Sec 13 and T12N R2W Sec 19, 29, 30 Lewis and Clark County	3.1 miles (Figure 6)	Recreational Wildlife Scenic	Yes	Scenic	0.25-mile on each side
3. Moose Creek	Entire creek length within Humbug Spires Wilderness Study Area	T1S R8W Sec 9, 10 Silver Bow County	4.0 miles (Figure 7)	Scenic Recreational	Yes	Scenic	0.25-mile on each side
4. Muskrat Creek	About 5 miles northeast of town of Boulder	T7N R3W Sec 31, 32, 33 Jefferson County	2.6 miles (Figure 8)	Fish	Yes	Scenic	0.25-mile on each side

¹T=Township, N=North, W=West, R=Range, Sec=Section, Montana Principal Meridian

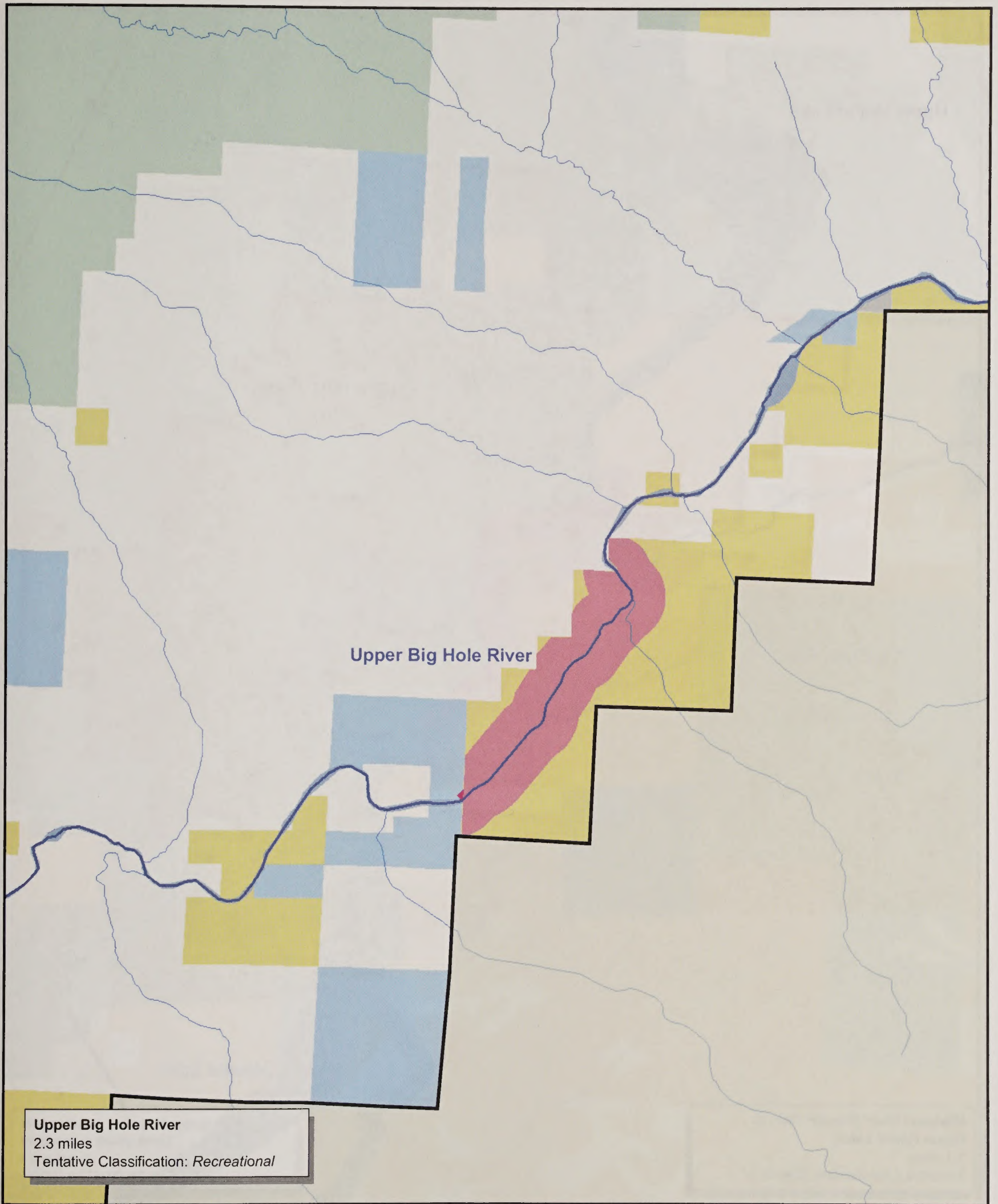
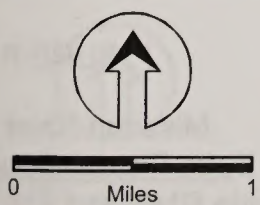


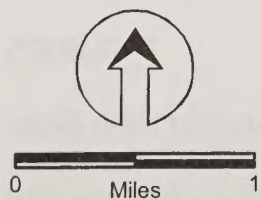
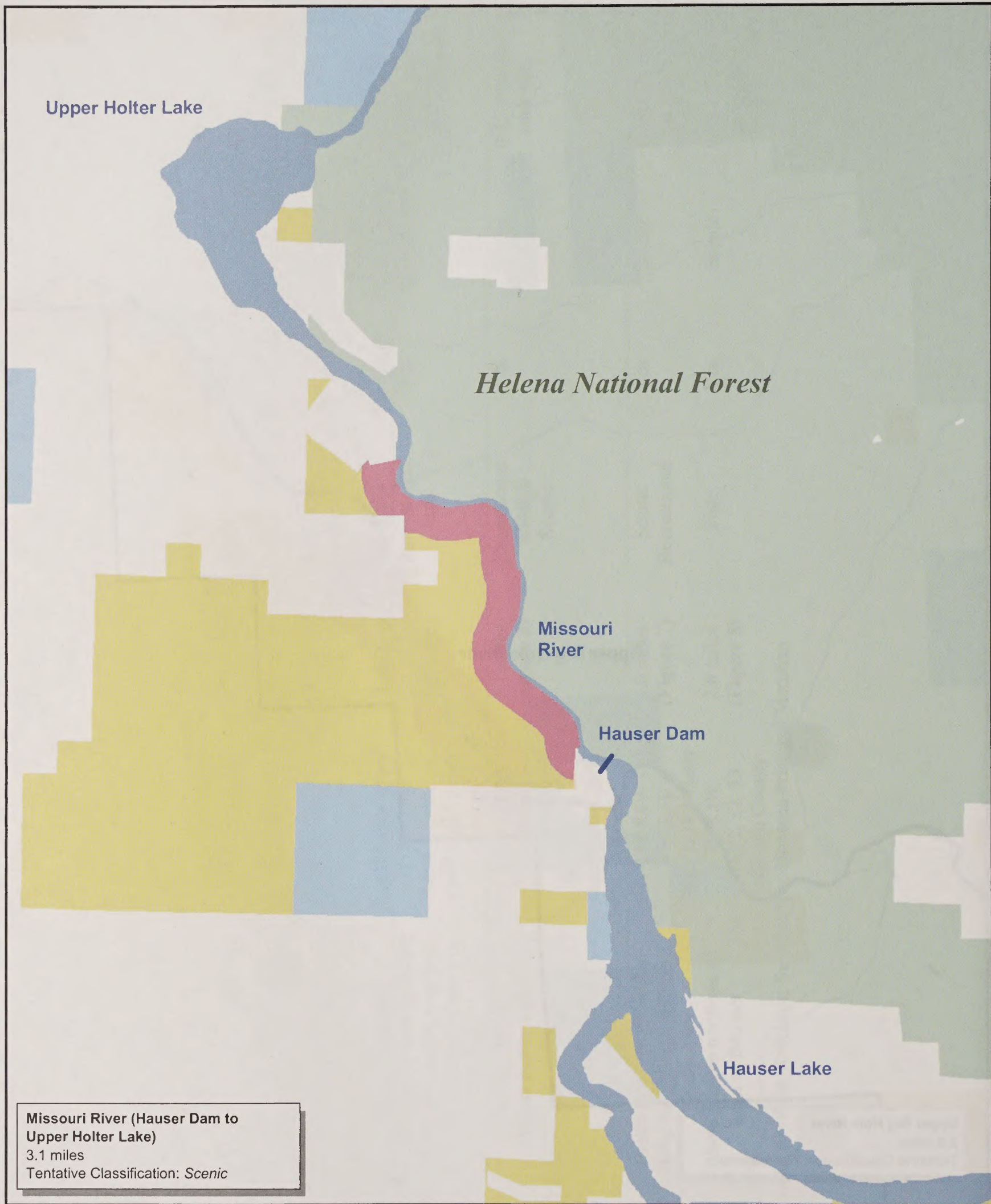
FIGURE 5

Upper Big Hole River
BLM, Butte Field Office
Butte RMP and EIS



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- | | | |
|--|--------------|--------------------|
| BLM | USFS | Roads |
| Private | Water | Rivers and Streams |
| State | BFO Boundary | Rivers of Interest |
| Eligible River Segments (Shaded area is 0.25 mile on either side of river where on BLM Land) | | |

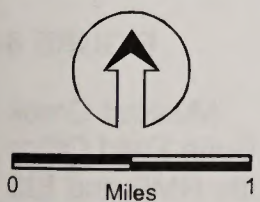
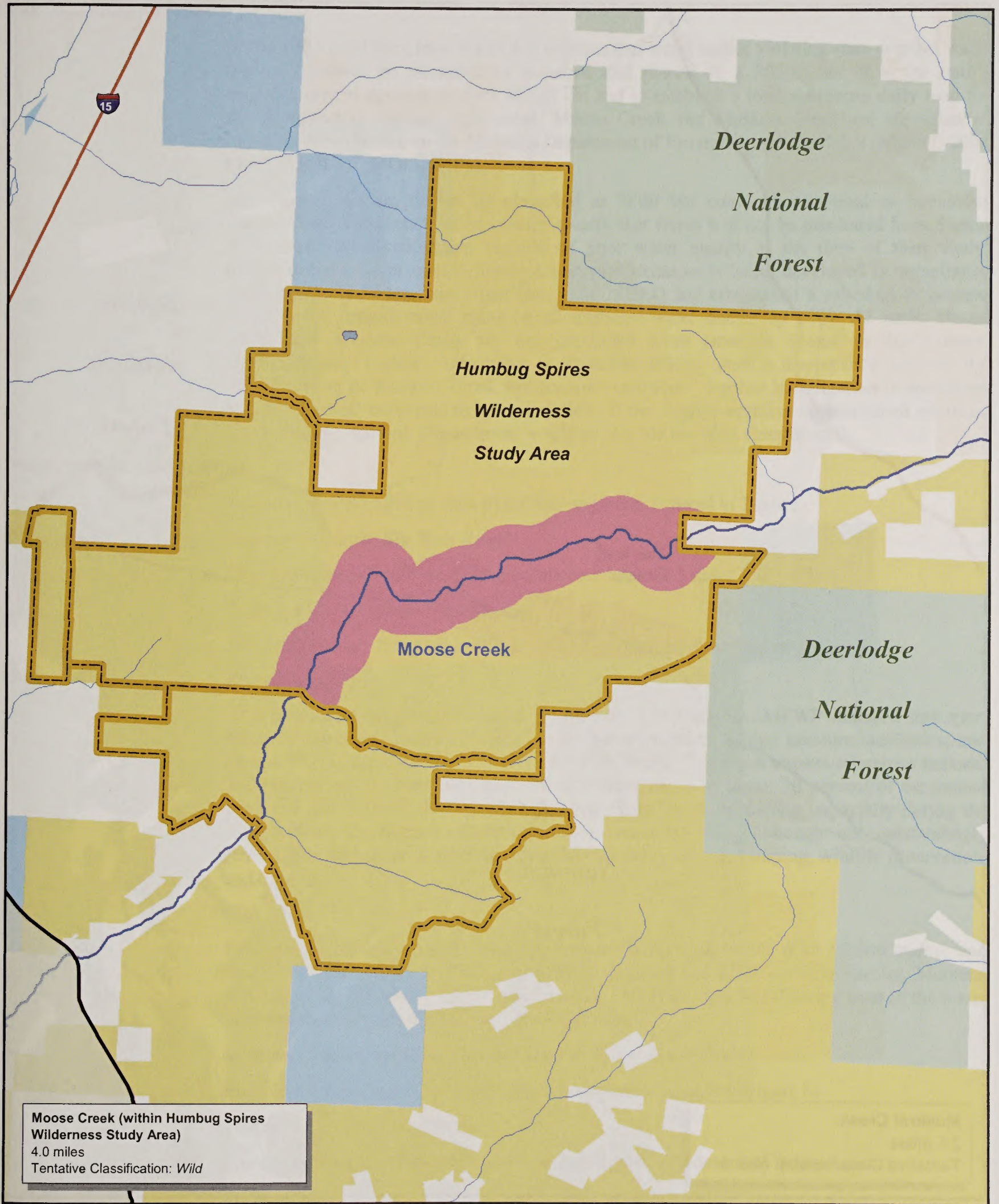


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- | | |
|--|---|
| BLM | USFS |
| Local Gov't | Water |
| Private | BFO Boundary |
| State | Eligible River Segments (Shaded area is 0.25 mile on either side of river where on BLM Land) |

FIGURE 6

Missouri River
 BLM, Butte Field Office
 Butte RMP and EIS



- | | |
|--------------|--|
| BLM | Humbug Spires Wilderness Study Area |
| Private | Rivers and Streams |
| USFS | Rivers of Interest |
| State | Interstate |
| BFO Boundary | Eligible River Segments (Shaded area is 0.25 mile on either side of river where on BLM Land) |

FIGURE 7

Moose Creek
BLM, Butte Field Office
Butte RMP and EIS

No warranty is made by the Bureau of Land Management (BLM) for use of data for purposes not intended by BLM.

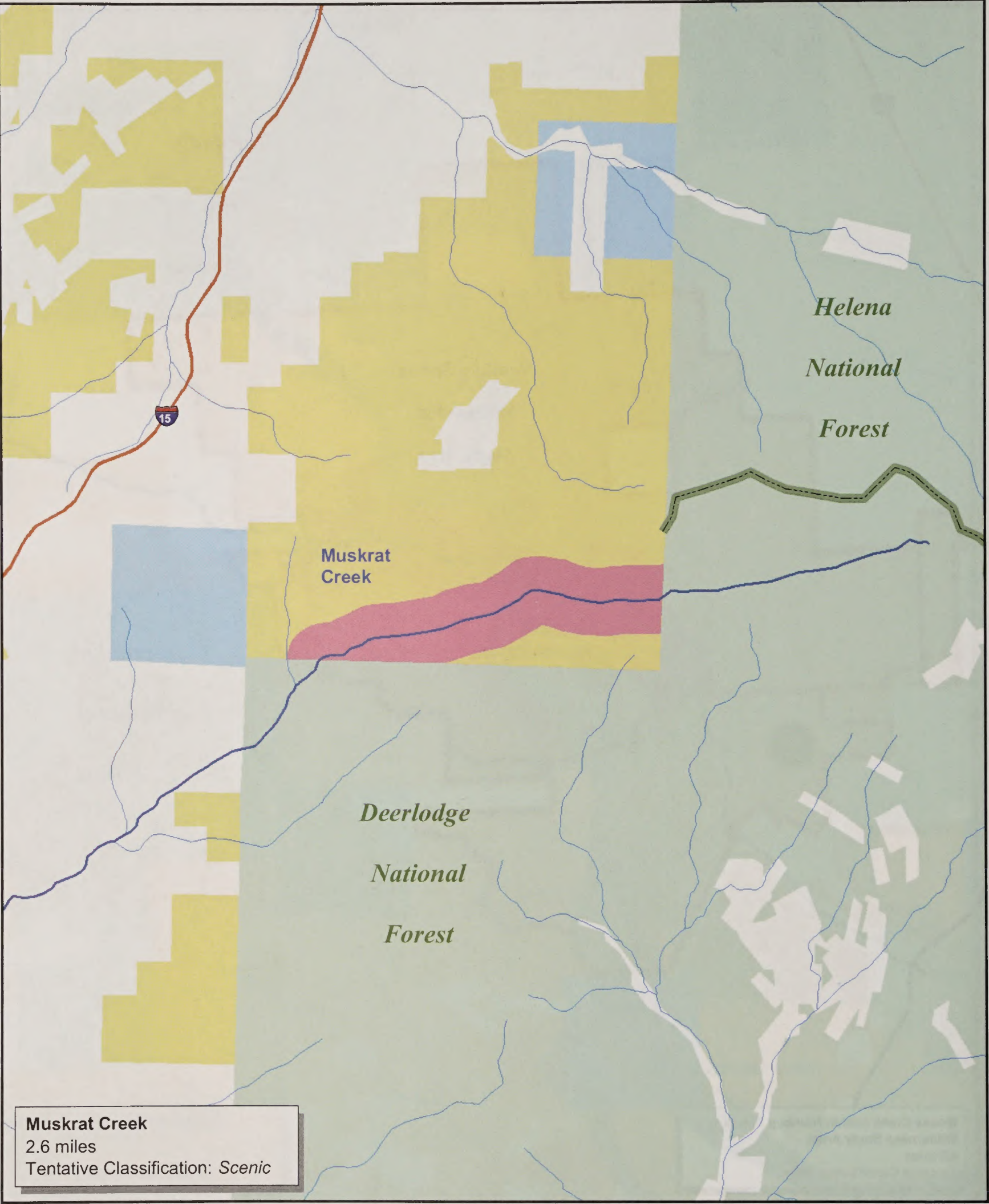


FIGURE 8

Muskrat Creek
BLM, Butte Field Office
Butte RMP and EIS

0 1 Miles

No warranty is made by the Bureau of Land Management (BLM) for use of data for purposes not intended by BLM.

IMPAIRED WATER BODIES

Section 303(d) of the Clean Water Act requires that water bodies violating state or tribal water quality standards be identified as impaired and placed on a 303(d) list. It is the state's responsibility to develop its own 303(d) list and to establish a total maximum daily load for the parameter(s) causing impairment. Moose Creek and Muskrat Creek are identified as impaired water bodies on the Montana Department of Environmental Quality's (MDEQ) 2004 Draft 303(d) list (MDEQ 2005).

An impaired stream cannot be classified as Wild but could be classified as Scenic or Recreational. The classification criteria specify that rivers will not be precluded from Scenic or Recreational classification because of poor water quality at the time of their study, provided that a water quality improvement plan exists or is being developed in compliance with applicable Federal and State laws. The MDEQ has established a schedule to prepare water quality improvement plans on all impaired water bodies by 2007. As such, Moose Creek and Muskrat Creek are not precluded from tentative Scenic or Recreational classifications. Further evaluations, as described below, show a discrepancy between the MDEQ listing of Muskrat Creek and current conditions. Further investigation is necessary, and this segment may need to be reclassified. If the eligible segment is determined not to be water quality impaired, this segment would be eligible for Wild classification.

TENTATIVE CLASSIFICATION

Tentative classification of each of the four segments is listed in Table 1.

Segment 1: Upper Big Hole River

Eligible segment length on BLM-administered lands: 2.3 miles (Figure 5)

Tentative Classification: Recreational

The outstandingly remarkable values for this segment are described below.

Recreational

This river reach is rated as a Class 1, Blue Ribbon Fisheries. MFWP assessed this sport fisheries value based on a combination of fish abundance, fishing pressure, aesthetics, and access. This is the highest rating given for state rivers. This reach attracts numerous national and international visitors, and out-of-state visitors represent about 30 percent of the annual use each year (MFWP 2004a). The area is famous for its fly-fishing, especially during the salmon/stone fly hatches. Other quality recreational uses, although not outstandingly remarkable, include river floating (May through July), hiking, camping, wildlife observation, and hunting.

Fish

Fish species include rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and brook trout (*Salvelinus fontinalis*), and the State-listed and BLM sensitive species, Montana arctic grayling (*Thymallus arcticus montanus*). This is the only free-flowing river in the lower 48 states that supports the Montana arctic grayling.

Segment 2: Missouri River (Hauser Dam to Upper Holter Lake)

Eligible segment length on BLM-administered lands: 3.1 miles (Figure 6)

Tentative Classification: Scenic

The outstandingly remarkable values for this segment are described below.

Recreational

This river reach is rated as a Class 1—Blue Ribbon Fisheries, which is the highest rating given for state rivers. MFWP assessed this sport fisheries value, based on a combination of fish abundance, fishing pressure, aesthetics, and access. This reach attracts numerous national and international anglers for brown and rainbow trout and Kokanee salmon (*Oncorhynchus nerka kennerlyi*).

This reach is also part of the Lewis and Clark National Historic Trail. The Lewis and Clark Expedition passed through this reach on July 20, 1805, on their westward trek to the Pacific Ocean. On that day, Meriwether Lewis was traveling along the river, while William Clark was exploring the uplands and hunting game. This reach is expected to receive higher visitation from out-of-state residents during the bicentennial of the Lewis and Clark Expedition in 2005 and 2006. The corridor is highly natural, and for the most part still appears as seen by the Expedition.

Other high-quality recreational opportunities associated with this river segment and the adjoining BLM lands include river floating, primitive camping, hiking, wildlife observation, and big-game hunting.

Wildlife

There is significant habitat for regionally important populations of Federally-listed threatened bald eagle (*Haliaeetus leucocephalus*), bighorn sheep (*Ovis canadensis*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus anatum*), and osprey (*Pandion haliaetus*).

Scenic

Transitions in geology and topography provide outstanding vistas with stark contrasts. The upstream portion of the segment is bounded by steep colorful canyon walls that transition into rolling hill topography as one proceeds downstream. The alternating distant vistas contrasted with steep canyon walls provide a unique visual experience. The area is rated A for scenic quality, as defined in the BLM *Visual Resource Inventory Handbook*, H-8410-1 (BLM 1986).

Shoreline development criteria for Wild designation requires that development be primitive, with little evidence of human activity. The presence of a few inconspicuous structures, particularly those of historic or cultural value, is acceptable. However, due to the development visible from the river along this segment (e.g. the Beaver Creek parking area and a pit toilet) the Missouri River is not suitable for Wild designation.

Segment 3: Moose Creek

Eligible segment length on BLM-administered lands: 4.0 miles (Figure 7)

Tentative Classification: Scenic

The outstandingly remarkable values for this segment are described below.

Scenic

The scenic quality of this area is rated A. The combination of contrasting land features with pronounced rock spires, irregular topography, and the variety of color patterns along this creek corridor provide outstanding visual values that are managed as a Visual Resource Management (VRM) Class I area. The area immediately adjacent to the creek varies from wooded to meadow with a meandering creek and a well-developed riparian area. Upstream of where the trail diverges from the creek, it becomes steeper with water cascading through boulders. The creek returns to a meadow-type creek near the upstream end of the segment where it enters private land.

Recreational

The outstanding recreation opportunities associated with Moose Creek and the adjoining lands in the Humbug Spires Wilderness Study Area (WSA) attract visitors both nationally and internationally. The area was one of the first BLM Primitive Areas to be established and is protected as a WSA. This area was studied and recommended for wilderness in 1981.

The most popular forms of recreation include rock climbing, sightseeing, hiking, backpacking, hunting, wildlife observation, and primitive camping. Of these, the most unique and outstanding opportunity is for rock climbing. The granite spires provide some of the highest quality hard-rock climbing in Montana. There are about 10 spires between 300 and 600 feet high, and an additional 50 others that range between 50 and 300 feet. The spires are not located within the Moose Creek study corridor, but the hiking trail through the corridor provides access to the spires.

Hiking opportunities were also assessed as excellent in the Humbug Spires WSA, given the diversity in landform types and vegetation. Hiking challenges range from gentle maintained trails to adventurous game trails with numerous elevation changes. Hikers are afforded high-quality scenic views, wildlife observations, colorful wildflowers, remote campsites, and trout fishing along this perennial stream. The scenic and recreational values of the study corridor are not duplicated in any other proposed or existing wilderness area. The experiences to be found when visiting the Humbug Spires are unique and cannot be compared to those found anywhere else in the region (BLM undated).

The eligible segment's tentative classification would have been Wild if it were not listed as an impaired water body on MDEQ's Draft 2004 and Final 2002 303(d) list (MDEQ 2005), as discussed above in the section, "*Inventory Phase for the Butte RMP Revision, Impaired Water Bodies.*" The portion of Moose Creek south of the Humbug Spires WSA is not included in the eligible segment because it does not contain any outstandingly remarkable values.

Segment 4: Muskrat Creek

Eligible segment length on BLM-administered lands: 2.6 miles (Figure 8)

Tentative Classification: Scenic

The outstandingly remarkable values for this segment are described below.

Fish

Muskrat Creek, a tributary to the Boulder River, provides significant habitat for westslope cutthroat trout (*Oncorhynchus clarki lewisi*). Genetically pure westslope cutthroat trout are estimated to exist in only two to four percent of their historic stream distribution (Montana Chapter of the American Fisheries Society 2004). Muskrat Creek contains genetically pure westslope cutthroat trout, and the headwaters of the stream are in a roadless area of BLM- and Forest Service-administered lands that is essentially primitive in nature.

MFWP, the BLM, and the USFS are collaborating to conserve westslope cutthroat trout in Muskrat Creek. A wooden barrier was constructed near the Forest Service boundary at river mile 7.6 in 1997. Since 1996, brook trout have been annually removed (using electrofishing) from Muskrat Creek upstream of the barrier to a natural barrier at river mile 9. In 1997, native westslope cutthroat trout also were relocated above the natural barrier (formerly a fishless section of stream). The westslope cutthroat trout relocated above the natural barrier survived and reproduced in the upper basin, and, by 2002, westslope cutthroat trout had expanded upstream to the headwaters (approximately river mile 13.5), as well as downstream throughout the stream.

Brook trout have been successfully removed between the manmade barrier and natural barrier. In the summer of 2003, only 18 brook trout were found in July, and no brook trout were captured during an extensive effort of four electrofishing passes in October. All the brook trout captured during July 2003 were age two and older, confirming that no brook trout successfully recruited to the population during the past two to three years. Approximately 4.5 miles of Muskrat Creek is once again considered to have a healthy population of westslope cutthroat trout. No brook trout were captured in 2004 or 2005 indicating that brook trout have been eradicated upstream of the constructed barrier. The Muskrat Creek population is considered the most secure and strongest westslope cutthroat trout population in the Elkhorn Mountains. Sampling will continue in the future.

Riparian vegetation is in excellent condition along Muskrat Creek on BLM- and USFS-administered lands. The riparian vegetation provides exceptionally high-quality habitat for numerous wildlife species, including critical winter habitat for elk (*Cervus elaphus*).

FINAL ELIGIBILITY DETERMINATIONS

Public comment will be accepted on eligibility recommendations in this report. The BLM will review comments and make adjustments if comments show eligibility criteria are not met. This could affect final decisions on eligible rivers and ultimately suitability decisions.

SUITABILITY STUDY PHASE FOR THE BUTTE RMP REVISION

The preliminary suitability evaluation is completed as the Draft RMP is prepared. Impacts that would occur from designation or nondesignation of the eligible river segments then would be analyzed in the EIS associated with the RMP. Public review and comment on preliminary suitability determinations included in the Draft RMP/EIS would be considered before the BLM makes final suitability determinations in the proposed RMP.

The WSR Act requires that interim management measures be developed to protect the free-flowing nature, outstandingly remarkable values, and recommended classification of suitable segments until Congressional action regarding designation is taken. Guidelines for interim management are included in Appendix C.

SUITABILITY CRITERIA FOR ELIGIBLE SEGMENTS

This section contains a discussion of the suitability factors related to each of the four eligible segments.

Segment 1: Upper Big Hole River

Length within Planning Area: 2.3 miles (Figure 5)

Tentative Classification: Recreational

Proposed Boundary: Approximately 0.25-mile from river bank on either side of the river.

1. Characteristics that do or do not make the river a worthy addition to the NWSRS:

The eligible segment contains recreational and fisheries outstandingly remarkable values, making the segment worthy of addition to the NWSRS. This segment of the Big Hole River provides important habitat for Montana arctic grayling.

A river ford used predominantly by hunters accessing the Beaverhead-Deerlodge National Forest is present within the segment. The feasibility of crossing varies depending on time of year and flows. Numerous vehicles have been mired while crossing, requiring a tow to extract them from the river. Consequently, the presence of this ford presents a safety hazard to many users. Use of this ford potentially impacts the Big Hole River water quality by increasing sediment, disturbing the bank, and leaking of oil and gas. Additionally, weeds are spread downstream as the river washes the undercarriage of vehicles.

There are no known water quality issues with this segment of the Big Hole River. Downstream of the eligible segment, from Divide Creek to the confluence with the Jefferson River, the Big Hole River has been identified as water quality impaired by the MDEQ 303d list (MDEQ 2005). This listing does not pertain to the eligible segment.

2. The status of landownership, minerals, use in the area, including the amount of private land involved and associated or incompatible uses:

Landownership within the 0.25-mile study corridor is predominantly Federal. The BLM manages 678 acres (89 percent). The BLM manages lands on both sides of the river for almost the entire segment (Figure 5). A private landowner controls the land along the western bank for approximately 0.25-mile at the northern end of the segment. There are two additional points where private land is within the 0.25-mile study corridor but not adjacent to the river along the western side.

The area has low oil and gas potential and very limited lode gold potential. There are no current or anticipated minerals uses in the area.

3. Reasonably foreseeable potential uses of the land and related waters that would be enhanced, foreclosed, or curtailed if the area were included in the NWSRS and values that would be foreclosed or diminished if the area is not protected as part of the NWSRS:

Grazing is permitted along this entire segment. Potential impacts from livestock grazing within the river corridor may include increased sedimentation resulting from bank erosion, transport of weed species, and increased nutrient input in the river. Designation of this segment could result in increased monitoring to ensure grazing activities are not adversely impacting the recreational and fisheries outstandingly remarkable values. If adverse impacts

are observed or anticipated, management of grazing in this segment would be more restricted on BLM land. Grazing occurring upstream on private land would not be subject to BLM's authority.

There is no active timber harvest occurring within the corridor. If the segment were included in the NWSRS, timber harvest within the study corridor would be prohibited.

Currently, recreational use within the study corridor consists of occasional camping and fishing. There are no developed facilities present. In addition, the ford described earlier provides hunting access to the Beaverhead-Deerlodge National Forest. In general, use is relatively light, the area is not well known outside the Butte area. Designation of this segment would bring national recognition to this segment and would likely attract visitors from a much greater area. Because of the small acreage of BLM land, increased use would be difficult to disperse and manage. This could cause significant negative impacts to the riparian habitat and stream and reduce the value of this segment as a National WSR. Consequently, camping and fishing access would either need to be developed and intensely managed or restricted as popularity increases.

4. Federal or State agency that will administer the river should it be added to the NWSRS.

If the river were added to the NWSRS, this segment would be administered by the BLM.

5. Federal, State, Tribal, local, public, or other interest in designating or not designating the river, including the extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state, local, or other agencies and individuals:

No comments were received during the scoping period pertaining to designation of this segment. Other Federal agencies, the State, local, public and other interests will have the opportunity to review and comment on this report. Any interest in designating or not designating would be identified during this period, and this section would be revised accordingly.

6. Estimated cost to the United States of acquiring necessary lands, interests in lands, and administering the area should it be added to the NWSRS:

The 2.3-mile segment being studied is predominantly Federal land. The outstandingly remarkable values could be protected or enhanced without further acquisition of land. The BLM would consider the acquisition of fee title or conservation easements on the remaining 27 acres of private land within the 0.25-mile study corridor. Cost of acquisition would be approximately \$1,000 per acre.

7. A determination of the degree to which the State or its political subdivision(s) might participate in the preservation and administration of the river should it be proposed for inclusion in the NWSRS:

MFWP would continue to regulate floating outfitters. Regulations currently limit the days of the week outfitters are permitted to float certain sections of the Big Hole River. These regulations serve to maintain the recreational outstandingly remarkable values and reduce fishing pressure in certain areas.

The State controls a small parcel of land immediately upstream of the segment. Currently, State management of this parcel is compatible with the protection and enhancement of the recreational and fisheries outstandingly remarkable values within the eligible segment. Because it is immediately upstream of the eligible segment, activities on the State parcel could impact water quality within the eligible segment. Management would need to be coordinated with the State.

8. The Federal agency's ability or other mechanisms to protect and manage the identified river related values other than WSR designation:

The BLM currently has a Big Hole River Plan which describes management for all BLM parcels along the river, including the eligible segment. This plan provides management measures which would protect the outstandingly remarkable values in the eligible segment. Management measures from the Big Hole River Plan include the following:

- Visual qualities on BLM lands as seen from the river will be maintained to protect recreation quality and scenic viewing in accordance with VRM Classifications. Currently, most of the corridor is managed on VRM Class II. Under this Classification, changes in the basic elements due to management action should not be evident within the landscape as seen from the river.
- Do not issue grazing leases on BLM parcels within the Recreation Management Area (RMA) that are currently unleased or not allotted.
- No surface occupancy stipulations within ¼ mile of the river or in critical seen areas should be established for new oil and gas leases. In addition, leases will be subject to vehicle use restrictions.
- All road construction on BLM lands within the RMA must be compatible with the specific management objectives of this plan.
- Enact travel restrictions within developed and undeveloped recreation sites as necessary to protect resources
- All BLM lands within a one mile corridor from each side of the river shall be retained in public ownership
- Acquire additional land within the RMA corridor as feasible to provide for increased recreational opportunities and protect scenic resource.
- Do not issue commercial recreation use permits on the Big Hole River and limit permits for commercial camps and other uses within the RMA based on available space and public uses.

This segment is categorized as a VRM Class II area. The management objective for Class II areas is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The BLM, within the site specific travel plan is assessing management alternatives for the use of the ford, which presents both water quality and safety concerns. Current management allows unrestricted crossings, which could adversely affect water quality and therefore fisheries values in the segment. Management changes such as prohibiting use of the ford or limiting use to game retrieval would only reduce the potential degradation of water quality and bank erosion. River flows within the upper reach are subject to seasonal moisture conditions and existing water rights. These conditions typically reduce flow in late summer to levels that impact fishery resources and prevent recreational floating.

9. An evaluation of the adequacy of local zoning and other land use controls in protecting the river's outstandingly remarkable values by preventing incompatible development:

The 27 acres (4 percent) of private land would be subject to local zoning controls. Local zoning would not be adequate to prevent new construction on the private land holdings within the WSR study corridor. No new development is allowed within 150 feet of the high water mark along the Big Hole River, and a permit is required for construction within 500 feet of the high water mark. It is possible, that construction would be permitted within the ¼ mile study corridor. All 27 acres are within the floodplain.

10. Support or opposition to designation:

As of the time of the preliminary suitability determination there has been no known support or opposition to designation of this segment. Any comments received pertaining to this segment during the review of the draft RMP would be incorporated into this report and considered when making a final suitability determination.

11. Historical or existing rights that could be adversely affected with designation:

There are no known historical or existing rights that would be affected with designation.

12. The consistency of designation with other agency plans, programs, or policies in meeting regional objectives:

Designation of this segment would be consistent with the Big Hole River Management Plan, and VRM II classification, provided designation does not result in a significant increase in use. However, national recognition of this segment could result in a significant increase in the number of people visiting this segment, which could be incompatible with these other plans, given the high riparian and natural value of the area.

13. The contribution to a river system, watershed, or basin integrity:

The eligible segment provides important habitat for salmonid fish species, including the Montana arctic grayling. Aquatic habitat in this segment helps support the fish populations throughout the river system.

Segment 2: Missouri River (Hauser Dam to Upper Holter Lake)

Length within Planning Area: 3.1 miles (Figure 6)

Tentative Classification: Scenic

Proposed Boundary: Approximately 0.25-mile on from river bank on either side of the river.

1. Characteristics that do or do not make the river a worthy addition to the NWSRS:

The outstandingly remarkable recreational, scenic and wildlife values associated with this segment make it a worthy addition to the NWSRS. These values are described in detail in the eligibility portion of this report.

Flows are controlled by releases from Canyon Ferry and Hauser Dams, located near the segment's upstream end. The amount of water released is governed by the Federal Energy Regulatory Commission (FERC) license for operations with the Pennsylvania Power and Light Corporation (PPL) Montana. The FERC license provides adequate flows for recreational and fisheries needs. These flows are sufficient to protect the recreational, fisheries, and scenic outstandingly remarkable values described for this segment. The dam is only visible at the very upstream end of this segment. The river immediately takes a bend through the canyon, obscuring view of the dam. Generally, good water quality supports high quality fisheries.

The segment has limited access and very little development along the shore. These relatively primitive conditions provide a setting similar to what Lewis and Clark would have experienced during their journey westward.

The USFS maintains a small access area within the 0.25-mile study corridor at the mouth of Beaver Creek. This facility provides fishing access and consists of a toilet, small parking lot, and fence. During the site visit in August 2005, this area was barely visible from the river. Vegetation obscured views of the fence and parking lot, but the toilet was visible for a brief period where there was a gap in vegetation. The area is likely more visible during the fall and winter when foliage is not as thick. This is a relatively minor intrusion on the scenic values of this segment. Overnight camping at this site is not permitted.

2. The status of landownership, minerals, use in the area, including the amount of private land involved and associated or incompatible uses:

Almost all lands (93 percent) within 0.25-mile of the river bank along this segment are Federally-managed. The USFS, Helena National Forest manages lands along the eastern bank for the entire length. The BLM manages all lands along the western bank for the entire segment length. There is a small private landholding located near the downstream end of the segment west of the river channel approximately 1/8-mile inland from the shore. This private landholding is not essential to the protection and enhancement of outstandingly remarkable values and could be excluded from the designated corridor. These lands are not at risk to development given the conditions of an existing easement on the property.

The USFS has found this segment to be eligible for inclusion in the NWSRS but has not completed a suitability study.

Land uses include some permitted grazing on BLM land along the western shoreline. The area is not fenced, and cattle have access to the river. It appears that grazing pressure along this segment is relatively light because rough terrain limits access to the river corridor.

This segment of the Missouri River has no significant mineral potential. The general area has moderate potential for oil and gas discoveries, but exploration is not likely to take place along the river. There are no current mineral resource uses along this segment.

3. Reasonably foreseeable potential uses of the land and related waters that would be enhanced, foreclosed, or curtailed if the area were included in the NWSRS and values that would be foreclosed or diminished if the area is not protected as part of the NWSRS:

Although unlikely, any increase in the height of Holter Dam would be prohibited if the river were designated. Such an increase would change the free-flowing nature of the river in this segment. Increasing the height of Holter Dam and the resulting increase in the size of Holter Lake and Upper Holter Lake is not likely to occur and may be physically infeasible because of the area's topography and the number of residences and other structures located along the shores of Holter Lake and Upper Holter Lake.

If the segment were to become part of the NWSRS, potential changes in Hauser Dam operations, outside the current FERC license, which could be considered the next time the FERC license is renewed would need to consider how such change could affect the outstandingly remarkable values. Significant reduction or increase in water releases from Hauser Dam could adversely affect the recreational, scenic, and wildlife values associated with this segment. As a Federal agency, FERC would need to ensure protection of these values when relicensing.

Grazing on the BLM land could be subject to increased restrictions if the segment were included in the NWSRS. The BLM would monitor the effects of cattle access to the river to ensure that grazing use is not adversely affecting the outstandingly remarkable values. If restrictions are necessary to protect river values, the BLM would work with the grazing allotment permittee to establish adequate restrictions.

Designation of this segment would prevent the sale of Federal lands within the corridor and would prevent extensive development along its shoreline. This segment is part of the Lewis and Clark National Historic Trail and is currently in a condition similar to how it was during their expedition. Not designating this segment could potentially result in changes to the landscape, altering the primitive nature of this segment.

4. Federal or State agency that will administer the river should it be added to the NWSRS.

Administration of this segment would ultimately be decided by Congress. All lands included in the river corridor are Federally-managed. Administration would likely be joint management between BLM and USFS, as each agency currently manages half of the corridor.

5. Federal, State, Tribal, local, public, or other interest in designating or not designating the river, including the extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state, local, or other agencies and individuals:

The FERC and PPL Montana would have an interest in the designation of this segment as it pertains to water releases from Hauser Dam. Current operations, as identified in the FERC license, provide adequate flows to maintain the recreational, wildlife, and scenic outstandingly remarkable values associated with this segment. Although these flow requirements are not likely to change, relicensing efforts in the future would need to consider the protection of outstandingly remarkable values.

6. Estimated cost to the United States of acquiring necessary lands, interests in lands, and administering the area should it be added to the NWSRS:

All lands adjacent to the river segment are Federally-managed. Approximately 68 acres of land within 0.25-mile of the river are privately owned. This includes the private lands within 0.25-mile both upstream and downstream of the segment. The BLM would be capable of managing for the protection and enhancement of the outstandingly remarkable values without acquiring any lands. However, if BLM seeks acquisition of this small parcel of private land in order to have a continuous 0.25-mile corridor, land prices are approximately \$600 per acre.

The private parcel at the upstream end is owned by PPL Montana and is used for maintenance of the dam; acquisition is not likely.

Lands upstream would not be available or necessary to purchase as property is part of an administrative site owned by PPL Montana for operations at the dam. This utility company provides for river launching at this site which would compliment the management of the WSR designation. The parcel downstream would not be necessary to purchase to protect resource values as the private land is under an easement which prohibits residential development.

7. A determination of the degree to which the State or its political subdivision(s) might participate in the preservation and administration of the river should it be proposed for inclusion in the NWSRS:

MFWP would likely continue to manage for the recreational fisheries in this segment. This would be complimentary to the recreational outstandingly remarkable value that is linked to fishing opportunities.

8. The Federal agency's ability or other mechanisms to protect and manage the identified river related values other than WSR designation:

The BLM is able to manage its lands along the west bank of the segment for the protection of identified river-related values through its RMP. The eastern bank is managed by the USFS, Helena National Forest. River designation would provide for common goals and management objectives for the two Federal agencies.

9. An evaluation of the adequacy of local zoning and other land use controls in protecting the river's outstandingly remarkable values by preventing incompatible development:

This criterion is not applicable because all lands adjacent to this segment are Federally-managed.

10. Support or opposition to designation:

This is the suitability study report. During the scoping period, no support or opposition to designation of this segment was submitted. The public review of the draft RMP would provide an opportunity for other agencies and the public to review the preliminary findings and voice opposition or support.

11. Historical or existing rights that could be adversely affected with designation:

There are no known historic or existing rights that would be adversely affected with designation.

12. The consistency of designation with other agency plans, programs, or policies in meeting regional objectives:

Designation of this segment would be consistent with the objectives of the BLM's Butte RMP.

Designation of this segment would compliment the fisheries and recreational goals of the MFWP.

The USFS has not completed a suitability study for this segment. Designation would be consistent with the USFS eligibility determination, but successful management would depend on a similar suitability determination from USFS.

13. The contribution to a river system, watershed, or basin integrity:

Almost the entire flow in this segment is provided by releases from Hauser Dam. Only a small amount of water is added from the Beaver Creek tributary. This segment provides a very important contribution to the fisheries in the Missouri River watershed from Hauser Dam to Holter Dam downstream by providing important spawning habitat.

Segment 3: Moose Creek

Length within Planning Area: 4.0 miles (Figure 7)

Tentative Classification: Scenic

Proposed Boundary: Approximately 0.25-mile on from river bank on either side of the river.

1. Characteristics that do or do not make the river a worthy addition to the NWSRS:

Moose Creek contains outstandingly remarkable scenic and recreational values, as described in the eligibility section of this report, which make the river a worthy addition to the NWSRS.

Moose Creek from the headwaters to the mouth of the creek at the Big Hole River is identified as water quality impaired on the MDEQ 303d list (MDEQ 2005). The probable causes of impairment are dewatering and flow alteration. The probable sources of impairment are agriculture and crop-related sources. There is extensive agriculture upstream of the eligible segment located on private land. The BLM does not have authority to regulate activities on these lands and is subject to receive water from these areas into Moose Creek. The creek is categorized as 4C – Total Maximum Daily Loads (TMDLs) are not required; no pollutant-related use impairment identified. As a result, no plan for improving water quality in this segment is being developed.

2. The status of landownership, minerals, use in the area, including the amount of private land involved and associated or incompatible uses:

The entire eligible segment is located on BLM land within the Humbug Spires WSA. Upstream of the eligible segment, Moose Creek passes through private land. The private land is predominantly used for cattle grazing.

The area is currently used predominantly for recreational purposes such as hiking, camping, and providing access to climbing areas. These uses are compatible with the protection and enhancement of the segment's outstandingly remarkable values.

This segment has very low oil and gas potential. There are some known placer deposits along the creek and there is some limited potential for the discovery of lode gold deposits. There are no current mineral resource uses along this segment.

3. Reasonably foreseeable potential uses of the land and related waters that would be enhanced, foreclosed, or curtailed if the area were included in the NWSRS and values that would be foreclosed or diminished if the area is not protected as part of the NWSRS:

If the Humbug Spires WSA continues to be a WSA or becomes a designated Wilderness, reasonably foreseeable potential land uses would be compatible with the protection and enhancement of the segment's outstandingly remarkable values. If the WSA designation is removed by Congress without designating it as Wilderness, then the area could be opened to an array of potential land uses. If the segment were designated as part of the NWSRS, cattle grazing would continue to not occur along this segment.

Extraction of mineral in the area does not currently occur in accordance with the WSA designation. If the WSA designation were removed and the segment were designated in the NWSRS, mineral leasing and extraction would continue to be restricted.

4. Federal or State agency that will administer the river should it be added to the NWSRS.

The BLM, as the sole land manager, would administer the river should it be added to the NWSRS.

5. Federal, State, Tribal, local, public, or other interest in designating or not designating the river, including the extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state, local, or other agencies and individuals:

The upstream landowner has not yet been contacted regarding this potential designation. It is expected that the landowner will review and comment on the suitability findings during the draft RMP review period. It is anticipated, given the necessity of the United States to acquire property or easements, that the landowner may be opposed to designation. Reasons for the necessity of acquisition are described in criteria 1 and 6.

6. Estimated cost to the United States for acquiring necessary lands, interests in lands, and administering the area should it be added to the NWSRS:

To adequately address water quality impairment resulting from upstream land uses, the United States would need to acquire the upstream lands either in fee title or through conservation easements. It is not anticipated that the upstream landowners would be willing sellers. Without acquisition, dewatering and flow alteration problems would continue to affect the eligible segment, in addition to water quality problems associated with cattle grazing. The cost of acquisition would be a minimum of \$500 per acre, requiring 690 acres to be acquired. One option would be within ¼ mile of the stream for the entire length upstream of BLM, currently private to the USFS boundary.

7. A determination of the degree to which the state or its political subdivision(s) might participate in the preservation and administration of the river should it be proposed for inclusion in the NWSRS:

The land within the study corridor is entirely BLM administered. It is not anticipated that the State or its political subdivision would be required to participate in the administration of the river should it be proposed for inclusion in the NWSRS.

8. The Federal agency's ability or other mechanisms to protect and manage the identified river related values other than WSR designation:

Protection and enhancement of the recreational and scenic outstandingly remarkable values are currently provided by the areas designation as a WSA. The management goals and objectives within the Humbug Spires WSA are compatible with management as an eligible segment. WSA designation is temporary. Congress has the ability to either designate the area as Wilderness under the Wilderness Act, or remove the WSA designation entirely. If WSA designation is removed, the area would be managed in accordance with the RMP. Removal of WSA designation, without making it a designated Wilderness area, could open the area to land uses such as timber harvest and mineral activity. Introduction of these land uses in the area could degrade the riparian corridor and result in impacts on the recreational and scenic outstandingly remarkable values that make the segment a worthy addition to the NWSRS.

BLM does not have the authority to regulate land uses upstream of the eligible segment. Water quality problems resulting from cattle grazing activities upstream would continue to occur.

9. An evaluation of the adequacy of local zoning and other land use controls in protecting the river's outstandingly remarkable values by preventing incompatible development:

Current local zoning and other land uses controls upstream of the eligible segment are not adequate to address the water quality issues.

10. Support or opposition to designation:

It is anticipated that the upstream landowner may be opposed to designation. Should the landowner provide comments either on the draft RMP or through direct communication with the BLM, this statement would be revised accordingly.

11. Historical or existing rights that could be adversely affected with designation:

There are no known historical or existing rights that could be adversely affected with designation.

12. The consistency of designation with other agency plans, programs, or policies in meeting regional objectives:

Designation would be consistent with current management prescriptions as a WSA and with the Butte RMP.

13. The contribution to a river system, watershed, or basin integrity:

Below the eligible segment, Moose Creek flows for several miles before entering the Big Hole River at Maiden Rock. Water in Moose Creek contributes to the water quality and quantity of the Big Hole River system.

Segment 4: Muskrat Creek

Length within Planning Area: 2.6 miles (Figure 8)

Tentative Classification: Scenic

Proposed Boundary: Approximately 0.25-mile on from river bank on either side of the river.

1. Characteristics that do or do not make the river a worthy addition to the NWSRS:

Muskrat Creek contains fisheries outstandingly remarkable values related to its population of genetically pure westslope cutthroat trout. MFWP, BLM, and USFS have actively removed eastern brook trout and have installed a barrier downstream to prevent non-westslope cutthroat trout from migrating into the segment.

The high-quality riparian corridor provides critical winter habitat for elk and serves as a migration corridor for elk, moose, and bear.

Water Quality

Muskrat Creek from its headwaters to the mouth at the Boulder River has been identified as water quality impaired on the MDEQ 303d list (MDEQ 2005). However, there is some discrepancy between the MDEQ assessment and current conditions within the segment. The 303d list identifies the creek as not supporting aquatic life or coldwater fisheries or as a drinking water supply. The probable causes listed are copper, lead, metals, and other habitat alterations. Probable sources are listed as agriculture (grazing-related sources), and resource extraction (abandoned mines). There is no agriculture occurring either within or upstream of the eligible segment. An abandoned mine (Iron Mine) is located upslope of the headwaters of Muskrat Creek near Elkhorn Peak. The data used for the 303d assessment includes the following note: Iron Mine sediment samples were not obtained from Muskrat Creek substrate, but were obtained in the headwaters uplands (MDEQ 2005). It appears that the metals contamination listed has not been observed within the creek sediments, but rather is found upslope of the headwaters. Muskrat Creek is scheduled for a TMDL to address water quality issues between 2008 and 2012.

Based on BLM field observations, the eligible segment does not have the water quality issues described above and is capable of supporting aquatic life and coldwater fisheries. Data has not been collected to determine if the segment would be a suitable drinking water supply. Current conditions in the segment include significant habitat for westslope cutthroat trout, as described in the eligibility section of this report. MFWP, BLM, and USFS are collaborating to conserve westslope cutthroat trout within this segment and upstream on the USFS land. Measurements of pH have been taken at several points within the eligible segment and the results (7.3 to 10) indicate that the area is not contaminated with heavy metals. In addition, BLM has begun conducting invertebrate surveys and has found healthy populations indicative of good water quality. Water quality impairment may be an issue downstream of the eligible segment where the creek enters agricultural areas.

Invasive species are present within the corridor, as they are virtually everywhere. Some small patches of yellow toadflax (*Linaria vulgaris*) were observed along the trail. In addition, patches of trees were observed to be infected with mountain pine beetle (*Dendroctonus ponderosae*).

2. The status of landownership, minerals, use in the area, including the amount of private land involved and associated or incompatible uses:

All land within 0.25-mile of the eligible segment is Federally-managed. BLM manages lands on both sides of the creek for the entire length (Figure 8). Lands both upstream and downstream of the eligible segment are managed by the USFS, Deerlodge National Forest.

This segment has very low oil and gas potential. There are some known placer occurrences along the creek and there is some limited potential for the discovery of lode gold deposits. There are no current mineral resource uses along this segment.

3. Reasonably foreseeable potential uses of the land and related waters that would be enhanced, foreclosed, or curtailed if the area were included in the NWSRS and values that would be foreclosed or diminished if the area is not protected as part of the NWSRS:

The area would continue to be available for mountain biking, hiking, horseback riding, and dispersed camping. Foreclosing or curtailing these activities as a result of designation is not anticipated.

Current management does not permit mining within the study corridor. Historic mining (Iron Mine) occurred up slope of the headwaters on USFS land.

4. Federal or State agency that will administer the river should it be added to the NWSRS.

The eligible segment would be administered by BLM should it be added to the NWSRS.

5. Federal, State, Tribal, local, public, or other interest in designating or not designating the river, including the extent to which the agency proposes that administration of the river, including the costs thereof, be shared by state, local, or other agencies and individuals:

The USFS manages land upstream and downstream of the eligible segment. The USFS did not find either the segments on its land eligible for inclusion in the NWSRS.

6. Estimated cost to the United States of acquiring necessary lands, interests in lands, and administering the area should it be added to the NWSRS:

Acquisition of land or interests in lands would not be necessary.

7. A determination of the degree to which the State or its political subdivision(s) might participate in the preservation and administration of the river should it be proposed for inclusion in the NWSRS:

MFWP is actively involved in a westslope cutthroat trout restoration program with the BLM and USFS in this segment. It is expected that their involvement in the protection and enhancement of the fisheries outstandingly remarkable values would continue.

8. The Federal agency's ability or other mechanisms to protect and manage the identified river related values other than WSR designation:

The surrounding USFS land is managed as the Elkhorn Wildlife Management Unit. BLM has a Memorandum of Understanding (MOU) with USFS to manage the lands surrounding the eligible segment for the benefit of recreation and wildlife, including fisheries. Management in accordance with the MOU is compatible with the protection and enhancement of the fisheries outstandingly remarkable value. No timber harvest or mining is permitted within the study corridor or within the Elkhorns WSA. Although current management is compatible with the protection of the outstandingly remarkable values, the time frame of these management goals are limited to the expiration of the MOU and subject to RMP amendments. Designation into the NWSRS would more permanently protect these values.

9. An evaluation of the adequacy of local zoning and other land use controls in protecting the river's outstandingly remarkable values by preventing incompatible development:

Local zoning and other land use controls do not pertain to this segment because it is entirely located on Federal lands.

10. Support or opposition to designation:

This is the suitability study report. During the scoping period, no support or opposition to designation of this segment was submitted. The public review of the draft RMP would provide an opportunity for other agencies and the public to review the preliminary findings and voice opposition or support.

11. Historical or existing rights that could be adversely affected with designation:

There are no known historical or existing rights that would be adversely affected by designation.

12. The consistency of designation with other agency plans, programs, or policies in meeting regional objectives:

Designation would be consistent with the Butte BLM RMP and the MOU with the USFS regarding management of this segment. A non-motorized hiking trail exists along the creek and is currently managed by the USFS under a BLM right-of-way.

13. The contribution to a river system, watershed, or basin integrity:

Muskrat Creek flows into the Boulder River.

PRELIMINARY SUITABILITY DETERMINATION SUMMARY

Two of the four eligible segments were determined suitable for inclusion in the NWSRS. Below is a brief summary of each of the four segments.

Segment 1: Upper Big Hole River

This segment contains outstandingly remarkable recreational and fisheries values. The recreational values include readily accessible camping and fishing opportunities in a section rated as a Class I, Blue Ribbon Fisheries. The fisheries values include a population of BLM sensitive Montana arctic grayling. The segment supports high quality grayling habitat on the Big Hole River and lacks the high-density populations of rainbow and brown trout, which compete with grayling. The segment meets the tentative classification as a Recreational river due to the presence of a road parallel to the segment. There are several physical and management challenges associated with this segment. BLM control of water quality within the segment is somewhat limited. Upstream of the segment is a small state-owned parcel (approximately 0.25-mile) followed by extensive private land holdings. Without acquisition of private lands, the Federal government would have very little control over the potential water quality impacts related from private land uses such as grazing. Within the segment, the ford and grazing create potential water quality impacts. The BLM could more restrictively manage these land uses to further protect water quality. The largest management challenge could arise as a result of inclusion of this segment in the NWSRS. Designation in the NWSRS would bring national recognition to this relatively small (2.3-mile) section of the Big Hole River. Increased use of this segment would alter the recreational experiences that are currently identified as outstandingly remarkable. The dispersed camping opportunities would not be feasible with increased use given the small amount of BLM land between the road and the river and the important riparian areas. Consequently, it is likely BLM would have to institute more restrictive management measures regarding recreation in the area or develop campsites and provide facilities. These changes would alter the values currently associated with the segment. As a result, this segment has been determined **not suitable** for designation as a Recreational river within the NWSRS.

Segment 2: Missouri River (Hauser Dam to Upper Holter Lake)

This segment contains outstandingly remarkable recreational, wildlife, and scenic values. The segment, which is primarily accessible by boat, is rated as a Class I, Blue Ribbon Fisheries, attracting national and international anglers. The river corridor provides significant habitat for bald eagle, osprey, golden eagle, peregrine falcon and bighorn sheep. Bald and golden eagle, osprey, and peregrine falcon depend upon the fisheries for food and the riparian corridor for nesting and perching habitats. Big horn sheep primarily use the river corridor for water and forage. Although flows are controlled by Canyon Ferry and to a lesser degree Hauser Dam, the FERC license requires adequate flows for fisheries habitat. These required flows maintain the free-flowing nature of the segment and provide flows suitable for the protection of the recreational, wildlife, and scenic outstandingly remarkable values. The segment meets classification criteria as Scenic because there is limited access to the segment, no parallel roads and development along the segment is limited to the Beaver Creek parking area and a pit toilet maintained by the USFS. Some dispersed camping occurs along the segment, but there are no developed sites. Due to the Beaver Creek parking area and pit toilet, both visible from the river, this segment is not designated as Wild because it does not meet the criteria that shoreline development be primitive. Designation of this segment as Scenic would result in minimal changes to existing management but would result in legislatively protecting the riparian corridor and provide a common goal for BLM and USFS coordination of the segment. As of this report, the USFS has found this segment to be eligible for inclusion in the NWSRS but has not completed a suitability study of the segment (Helena National Forest 1989). Because the BLM manages one side of the river and the USFS manages the other, successful management of this segment depends on cooperative management between the BLM and USFS. This segment has been determined **preliminarily suitable for designation**

as a **Scenic river** within the NWSRS. Because successful management of this segment depends on coordination with the USFS, the final BLM suitability determination will be deferred until the USFS completes a suitability study of this segment.

Segment 3: Moose Creek (segment within Humbug Spires WSA)

This segment contains outstandingly remarkable recreational and scenic values. The recreational values are related to the hiking, fishing, and primitive camping opportunities including providing a scenic hiking trail that provides access to the Humbug Spires for rock climbing. The scenic values are related to the variety of color patterns and habitats within the river corridor, which change from meandering through meadows, to wooded, to cascading boulders, returning to meadow at the upstream end. In addition, at several locations along the creek, generous views of the spires are available. The entire segment is located within the Humbug Spires WSA with access limited to the trailhead located at the downstream end of the segment. A hiking trail parallels the creek for the lower third; the upper two-thirds are accessible only by bushwhacking, as no trail exists. The primary characteristic making this segment not worthy of designation is water quality. The segment is listed as water quality impaired by the MDEQ 303d list, and there is no restoration plan in place or planned for development. The causes of water quality impairment are related to private land uses upstream of the eligible segment. Federal agencies, including BLM, do not have authority to regulate these land uses. In order, to remedy the water quality issues, the BLM would need to acquire these lands or an interest in the lands (through easement) along the river corridor. Such acquisition would be fairly expensive, and likely against the wishes of the landowner. Protection of the recreational and scenic outstandingly remarkable values within the BLM authority is currently provided by the WSA designation. However, the protections afforded by WSA designation are dependent upon the continued WSA designation or legislative action to formally designate the area as Wilderness under the Wilderness Act. Removal of WSA designation could result in the introduction of commodity based land uses, which could impact the recreational and scenic values of this segment. As a result of the water quality issues, this segment has been determined **not suitable** for inclusion in the NWSRS.

Segment 4: Muskrat Creek

This segment contains outstandingly remarkable fisheries values related to its population of westslope cutthroat trout. Muskrat Creek, through the efforts of BLM, MFWP, and USFS, is considered to have a healthy genetically pure westslope cutthroat trout population. The high-quality riparian habitat provides critical winter elk habitat and a migration corridor for elk, moose and bear. The only potential detracting characteristic of this segment is related to water quality. A trail parallels the segment for its entire length. The only development along this segment consists of a small wooden footbridge located approximately 1.5 miles upstream from the trailhead. Remnants of another small footbridge were observed near the upstream end of the segment. The MDEQ has listed Muskrat Creek including the eligible segment as water quality impaired and is developing a TMDL to restore water quality. However, observations within this segment show no evidence of water quality impairment. Further investigation is necessary for confirmation, but it appears that the segment may need to be removed from the 303d list. Designation of this segment would result in minimal changes from current management but would ensure protection of the fisheries values through legislative designation. This segment has been determined **suitable for designation as a Scenic river** within the NWSRS. If further examination determines that the segment has good water quality, and is subsequently removed from the MDEQ 303d list, the segment would be **suitable for designation as a Wild river** within the NWSRS. This suitability study has examined only the portion of Muskrat Creek on BLM land as a stand alone segment. The USFS manages portions of Muskrat Creek both upstream and downstream of this segment which may also be suitable for designation. If the USFS completes an eligibility and suitability determination, the total length of the segment worthy for designation within the NWSRS may increase.

INTERIM MANAGEMENT

Interim protection for preliminarily suitable segments is described in Appendix C.

Missouri River

Current BLM management of this segment is sufficient to protect the free-flowing nature and outstandingly remarkable values within BLM's authority that make this segment suitable for designation as a Scenic river in the NWSRS. Successful long-term management of this segment needs to be closely coordinated with the USFS, which manages the opposite shoreline.

Muskrat Creek

Current BLM management of this segment is sufficient to protect the free-flowing nature and outstandingly remarkable fisheries values that make this segment suitable for designation within the NWSRS. Continued coordination with USFS and MFWP would be critical to maintain the genetic purity of westslope cutthroat trout in the segment. Although it appears that heavy metals from the abandoned Iron Mine are not reaching the creek, an assessment of potential impact should be conducted. It may be necessary to take additional protective measures to ensure that contamination does not occur.

Although the Upper Big Hole River and Missouri River segments were preliminarily found not suitable, if an alternative is chosen that includes these segments as being recommended suitable, protective management would apply.

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GLOSSARY

ELIGIBLE RIVER SEGMENT. A section of a river that qualifies for inclusion in the National Wild and Scenic River System through determination that it is free-flowing and with its adjacent land area possessing at least one river-related value considered to be outstandingly remarkable.

PLANNING AREA. The geographical area for which land use and resource management plans are developed and maintained.

RESOURCE MANAGEMENT PLAN (RMP). A land use plan that establishes land use allocations, multiple-use guidelines, and management objectives for a given planning area. The BLM has used the RMP planning system since about 1980.

SUITABLE RIVER. A river segment found, through administrative study by an appropriate agency, to meet the criteria for designation as a component of the National Wild and Scenic Rivers system, specified in Section 4(a) of the Wild and Scenic Rivers Act.

APPENDIX A

ELIGIBILITY CRITERIA

INTRODUCTION

For the purpose of classification, a river area may be divided into segments. For example, changes in river character, such as the presence of dams and reservoirs, significant changes in types or amounts of development, significant changes in physiographic character, tributaries, or features, and/or significant changes in land status, should be considered in identifying river segments for evaluation. Management strategies necessary to administer the entire river area should also be taken into account. As such, excessive segmentation should be avoided. Each segment, considered as a whole, needs to conform to either the Wild, Scenic, or Recreational classification. There are no specific requirements for segment length. Congress has designated a segment as short as four miles. A river segment is of sufficient length if a specific outstandingly remarkable value or values can be protected (a factor in the suitability determination, not eligibility determination), should the segment be designated. An entire stream could be one segment.

Each identified river segment in the RMP planning area must be evaluated to determine whether or not it is eligible for inclusion in the NWSRS. To be eligible, a river segment must be “free-flowing” and must possess at least one “outstandingly remarkable” value. Free-flowing means “existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the water.” Please note the following:

- A river below a dam or impoundment can still be eligible;
- A river need not be navigable by water craft in order to be eligible; and
- There are no specific requirements concerning the flow of an eligible river segment. Flows are sufficient if they sustain or complement the outstandingly remarkable values for which the segment would be designated. As such, intermittent and ephemeral streams can be eligible.

OUTSTANDINGLY REMARKABLE VALUES

The determination of whether a river area contains “outstandingly remarkable” values is a professional judgment and needs to be documented in the study report. In order to be considered as outstandingly remarkable, a river-related value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. While the spectrum of resources that may be considered is broad, all values should be directly river related. That is, they should have the following characteristics:

- Be located in the river or on its immediate shorelands (for the purposes of this study, the preliminary boundary is 0.25 mile on either side of the river);
- Contribute substantially to the functioning of the river ecosystem; or
- Owe their location or existence to the presence of the river.

The following are general guidelines for the outstandingly remarkable values for which river segments can be eligible. Only one such value is needed for eligibility.

SCENIC

The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features or attractions. When analyzing scenic values, additional factors, such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed, may be considered. Scenery and visual attractions may be highly diverse over most of the river or river segment.

RECREATIONAL

Recreational opportunities are or have the potential to be popular enough to attract visitors from throughout or beyond the region of comparison or are unique or rare within the region. Visitors are willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but are not limited to, sightseeing, wildlife observation, camping, photography, hiking, fishing and boating.

- Interpretive opportunities may be exceptional and may attract or have the potential to attract visitors from outside the region of comparison.
- The river may provide or have the potential to provide settings for national or regional usage or competitive events.

GEOLOGICAL

The river, or the area within the river corridor, contains one or more examples of a geologic feature, process, or phenomenon that are unique or rare within the region of comparison. The features may be in an unusually active stage of development, represent a textbook example, or represent a unique or rare combination of geologic features (erosional, volcanic, glacial, or other geologic structures).

FISH

Fish values may be judged on the relative merits of either fish populations or habitat or a combination of the following river-related conditions:

- *Populations.* The river is nationally or regionally one of the top producers of resident, indigenous, or anadromous fish species. Of particular significance may be the presence of wild or unique stocks or populations of state- or US-listed or candidate threatened and endangered species.
- *Habitat.* The river provides exceptionally high quality habitat for fish species indigenous to the region. Of particular significance is habitat for state- or US-listed or candidate threatened and endangered species.

WILDLIFE

Wildlife values may be judged on the relative merits of either wildlife populations or habitat, or a combination of the following conditions:

- *Populations.* The river or area within the river corridor contains nationally or regionally important populations of resident or indigenous wildlife species dependent on the river environment. Of particular significance may be species considered to be unique or populations of state- or US-listed or candidate threatened and endangered species.
- *Habitat.* The river or area within the river corridor provides exceptionally high quality habitat for wildlife of national or regional significance or may provide unique habitat or a critical link in habitat conditions for state- or US-listed or candidate threatened and endangered species. Contiguous habitat conditions are such that the biological needs of the species are met.

CULTURAL

The river or area within the river corridor contains a site or sites where there is evidence of occupation or use by Native Americans. Sites must be rare or must have unusual characteristics or exceptional human-interest values. Sites may have national or regional importance for interpreting prehistory; may be rare; may represent an area where culture or a cultural period was first identified and described; may have been used concurrently by two or more cultural groups; or may have been used by cultural groups for rare or sacred purposes.

HISTORIC

The river or area within the river corridor contains a site or sites or feature or features associated with a significant event, an important person, or a cultural activity of the past that was rare or unusual in the region. A historic site or feature in most cases is 50 years old or

older. Sites or features listed in or eligible for inclusion in the National Register of Historic Places may be of particular significance.

OTHER SIMILAR VALUES

While no specific evaluation guidelines have been developed for the other similar values category, additional values deemed relevant to the eligibility of the river segment should be considered in a manner consistent with the foregoing guidance, including, but not limited to, hydrologic, ecologic/biologic diversity, paleontologic, botanic, and scientific study opportunities.

APPENDIX B

CLASSIFICATION CRITERIA FOR WILD, SCENIC, AND RECREATIONAL RIVER AREAS

Table B-1
Classification Criteria for Wild, Scenic, and Recreational River Areas

Attribute	Wild	Scenic	Recreational
Water Resources Development (impoundments, diversions, etc.)	Free of impoundment	Free of impoundment	Some existing impoundment or diversion. The existence of low dams, diversions, riprap, or other modifications of the waterway is acceptable, provided the waterway remains generally natural and riverine in appearance.
Shoreline Development	Essentially primitive. Little or no evidence of human activity. The presence of a few inconspicuous structures, particularly those of historic or cultural value, is acceptable. A limited amount of domestic livestock grazing or hay production is acceptable. Little or no evidence of past timber harvest. No ongoing timber harvest.	Largely primitive and undeveloped. No substantial evidence of human activity. The presence of small communities or dispersed dwellings or farm structures is acceptable. The presence of grazing, hay production, or row crops is acceptable. Evidence of past or ongoing timber harvest is acceptable, provided the forest appears natural from the riverbank.	Some development. Substantial evidence of human activity. The presence of extensive residential development and a few commercial structures is acceptable. Lands may have been developed for the full range of agricultural and forestry uses. May show evidence of past and ongoing timber harvest.

Table B-1
Classification Criteria for Wild, Scenic, and Recreational River Areas (continued)

Attribute	Wild	Scenic	Recreational
Accessibility	Generally inaccessible except by trail. No roads, railroads, or other provision for vehicular travel within the river area. A few existing roads leading to the boundary of the river area is acceptable.	Accessible in places by road. Roads may occasionally reach or bridge the river. The existence of short stretches of conspicuous or longer stretches of inconspicuous roads or railroads is acceptable.	Readily accessible by road or railroad. The existence of parallel roads or railroads on one or both banks, as well as bridge crossings and other river access points, including fords, is acceptable.
Water Quality	Meets or exceeds Federal criteria or Federally approved state standards for aesthetics, for propagation of fish and wildlife normally adapted to the habitat of the river, and for primary contact recreation (swimming), except where exceeded by natural conditions.	No criteria prescribed by the Wild and Scenic Rivers Act. The Federal Water Pollution Control Act Amendments of 1972 have made it a national goal that all waters of the United States be made fishable and swimmable. Therefore, rivers will not be precluded from scenic or recreational classification because of poor water quality at the time of their study, provided a water quality improvement plan exists or is being developed in compliance with applicable Federal and state laws.	

Source: Federal Register. National Wild and Scenic Rivers System; Final Revised Guidelines for Eligibility, Classification, and Management of River Areas. Section 1(3), Vol. 47, No. 173, page 39461. September 7, 1982.

APPENDIX C

INTERIM PROTECTION FOR CANDIDATE WILD AND SCENIC RIVERS

Table C-1
Interim Protection for Candidate Wild and Scenic Rivers

Wild and Scenic Rivers Act, Section 5(d)(1)¹		
Issue/Action	Eligible²	Suitable
Study Boundary	Minimum of 0.25-mile from ordinary high-water mark. Boundary may include adjacent areas needed to protect identified values.	Minimum of 0.25-mile from ordinary high-water mark. Boundary may include adjacent areas needed to protect identified values.
Preliminary Classification	Section 2(b): 3 classes: Wild, scenic, recreational, defined by statute. Criteria for classification described in Interagency Guidelines. Manage at preliminary classification.	Section 2(b): 3 classes: Wild, scenic, recreational, defined by statute. Criteria for classification described in Interagency Guidelines. Manage at preliminary classification.
Study Report Review Procedures		Notice of study report/draft EA ³ published in Federal Register. Comments/response from Federal, state, and local agencies and the public included in the study report/final EA ⁴ transmitted to the President and Congress.

Table C-1
Interim Protection for Candidate Wild and Scenic Rivers (*continued*)

Wild and Scenic Rivers Act, Section 5(d)(1)¹		
Issue/Action	Eligible²	Suitable
Private Land	Affect private land uses through voluntary partnership with state/local governments and landowners.	Affect private land uses through voluntary partnership with state/local governments and landowners.
*Administration		
*Acquisition	No regulatory authority.	No regulatory authority.
	No ability to acquire interest in land under the Act's authority prior to designation.	No ability to acquire interest in land under the act's authority prior to designation.
		Typically an evaluation of the adequacy of local zoning and land use controls is a component of suitability determination ⁵ .
Water Resources Project	River's free-flowing condition protected to the extent of other agency authorities; not protected under the act.	River's free-flowing condition protected to the extent of other agency authorities; not protected under the act.
Land Disposition	Agency discretion to retain lands within river corridor in Federal ownership.	Agency discretion to retain lands within river corridor in Federal ownership.
Mining and Mineral Leasing	Protect free flow, water quality, and outstandingly remarkable values through other agency authorities.	Protect free flow, water quality, and outstandingly remarkable values through other agency authorities.
Actions of Other Agencies	Affect actions of other agencies through voluntary partnership.	Affect actions of other agencies through voluntary partnership.
Protect Outstandingly Remarkable Values	No regulatory authority conferred by the act; agency protects through other authorities.	No regulatory authority conferred by the act; agency protects through other authorities.
	Section 11(b) 1: Limited financial or other assistance to encourage participation in the acquisition, protection, and management of river resources ⁶ .	Section 11(b) 1: Limited financial or other assistance to encourage participation in the acquisition, protection, and management of river resources ⁶ .

¹ Agency-identified study rivers as directed by Section 5(d)(1) of the act.

² A number of sources are available for identifying rivers under Section 5(d)(1). Under a Presidential Directive issued in 1979, each Federal agency, as part of its normal planning and environmental review processes, is required to avoid or mitigate adverse effects on rivers in the National Rivers Inventory.

³ Draft environmental assessment

⁴ Final environmental assessment

⁵ For an agency-identified study river that includes private lands, there is often the need to evaluate existing state and local land use controls and, if necessary, to assess the willingness of state and local government to protect river values.

⁶ Section 11(b)1 authorizes the Secretary of the Interior and Secretary of Agriculture or the head of any other Federal agency to provide for "limited financial or other assistance to encourage participation in the acquisition, protection, and management of river resources." This authority "applies within or outside a Federally administered area and applies to rivers which are components of the National Wild and Scenic Rivers System and to other rivers." The recipients of Federal assistance include states or their political subdivisions, landowners, private organizations, or individuals. Some examples of assistance under this section include, but are not limited to, riparian restoration, riparian fencing to protect water quality and riparian vegetation, of vegetative screening to enhance scenery/recreation experience.

APPENDIX D

RIVER SEGMENTS FROM INITIAL IDENTIFICATION EFFORTS

Table D-1 lists the Planning Area river and stream segments considered during initial identification efforts for the Wild and Scenic Rivers study process.

Table D-1
River Segments from Initial Identification Efforts

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values								Determination		
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible	
Big Hole River	15.20	6.96											X	
segment 1		0.39											X	
segment 2		0.34											X	
segment 3		0.79											X	
segment 4		0.16											X	
segment 5		0.95											X	
segment 6		0.40											X	
segment 7		0.28											X	
segment 8		2.30	Yes		X		X							X
segment 9		0.73											X	
segment 10		0.26											X	
segment 11		0.15											X	
segment 12		0.21											X	
Big Pipestone Creek	5.57	3.26											X	
Blackfoot River	2.22	1.90											X	
segment 1		1.62											X	
segment 2		0.28											X	
Boulder River	8.74	3.76											X	
segment 1		0.03											X	
segment 2		0.06											X	
segment 3		0.17											X	
segment 4		0.27											X	
segment 5		1.48											X	

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values								Determination	
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible
segment 6		0.13										X	
segment 7		0.91										X	
segment 8		0.71										X	
Cabin Creek	2.51	2.51										X	
Camp Creek	10.74	5.34										X	
segment 1		1.58										X	
segment 2		3.76										X	
Cataract Creek	1.88	0.37										X	
segment 1		0.06										X	
segment 2		0.25										X	
segment 3		0.06										X	
Charcoal Creek	1.77	1.31										X	
segment 1		1.13										X	
segment 2		0.18										X	
Chicken Gulch	2.09	2.09										X	
Clark Gulch	2.20	1.07										X	
Cline Gulch	1.38	1.34										X	
Confederate Gulch	5.43	3.28										X	
segment 1		0.85										X	
segment 2		0.36										X	
segment 3		0.16										X	
segment 4		1.06										X	
segment 5		0.11										X	

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values								Determination		
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible	
segment 6		0.63											X	
segment 7		0.11											X	
Connor Gulch	1.11	1.11											X	
Crow Creek	1.04	1.04											X	
DemiJohn Gulch	1.94	1.94											X	
Dry Creek	6.16	7.50											X	
segment 1		2.46											X	
segment 2	0.99	0.99											X	
segment 3	1.10	1.10											X	
segment 4		1.81											X	
segment 5		1.14											X	
Falls Gulch	1.54	1.54											X	
Fish Creek	1.40	0.91											X	
segment 1		0.61											X	
segment 2		0.30											X	
Fitz Creek	1.73	0.91											X	
Gold Run Creek	1.02	1.02											X	
Granite Creek	1.14	1.14											X	
Greenhorn Creek	2.15	0.59											X	
segment 1		0.27											X	
segment 2		0.32											X	
Hay Canyon	1.17	1.17											X	

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values								Determination		
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible	
High Ore Creek	5.22	2.19											X	
segment 1		0.15											X	
segment 2		1.01											X	
segment 3		0.15											X	
segment 4		0.07											X	
segment 5		0.07											X	
segment 6		0.56											X	
segment 7		0.19											X	
Homestake Creek	2.21	2.21											X	
Horse Gulch	2.43	2.43											X	
Indian Creek	9.30	6.73											X	
segment 1		1.10											X	
segment 2		0.85											X	
segment 3		3.67											X	
segment 4		1.10											X	
segment 5*		9.10								X			X	
Jackson Creek	2.98	0.50											X	
segment 1		0.39											X	
segment 2		0.11											X	
Jimmie New Creek	1.87	1.87											X	
Johnny Gulch	8.14	5.18											X	
segment 1		0.29											X	
segment 2		0.31											X	

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values							Determination			
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible	
segment 3		0.68											X	
segment 4		0.58											X	
segment 5		0.24											X	
segment 6		1.47											X	
segment 7		1.01											X	
segment 8		0.34											X	
segment 9		0.27											X	
Keating Gulch	6.39	1.24											X	
segment 1		0.09											X	
segment 2		0.28											X	
segment 3		0.08											X	
segment 4		0.11											X	
segment 5		0.41											X	
segment 6	0.27	0.27											X	
Little Prickly Pear Creek	5.49	3.52											X	
segment 1		3.05											X	
segment 2		0.47											X	
Little Whitetail Creek	4.17	2.12											X	
segment 1		1.41											X	
segment 2		0.71											X	

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values							Determination			
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible	
Lost Horse Creek	5.40	0.85											X	
	segment 1		0.02										X	
	segment 2		0.15										X	
	segment 3		0.27										X	
	segment 4		0.24										X	
segment 5		0.17											X	
Lump Gulch	7.91	2.56											X	
	segment 1		1.27										X	
	segment 2		1.03										X	
segment 3		0.26											X	
Missouri River	43.79	29.21											X	
	segment 1		3.05	Y		X								X
	segment 2		5.47										X	
	segment 3	.	2.77										X	
	segment 4		14.21										X	
	segment 5		1.66										X	
	segment 6		0.13										X	
	segment 7		0.14										X	
	segment 8		0.27										X	
	segment 9		0.48										X	
	segment 10		0.76										X	
segment 11		0.27										X		

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values								Determination	
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible
Moose Creek	11.88	7.46										X	
segment 1		4.00	Y	X	X			X					X
segment 2		3.46										X	
Muskrat Creek	2.60	2.60	Y				X						X
Nelson Gulch	1.64	1.64										X	
Patton Gulch	1.79	1.59										X	
segment 1		1.53										X	
segment 2		0.06										X	
Piegian Creek	4.18	1.37										X	
segment 1		0.14										X	
segment 2		0.27										X	
segment 3		0.06										X	
segment 4		0.11										X	
segment 5		0.17										X	
segment 6		0.46										X	
segment 7		0.06										X	
segment 8		0.10										X	
Prickly Creek	1.92	1.16										X	
segment 1		0.89										X	
segment 2		0.27										X	
Saint Louis Gulch	1.59	0.49										X	
segment 1		0.04										X	
segment 2		0.45										X	

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values							Determination		
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible
Sevenmile Creek	1.35	1.28										X	
Sheep Creek	3.74	3.09										X	
Silver Creek	5.25	2.81										X	
segment 1		0.12										X	
segment 2		0.28										X	
segment 3		0.37										X	
segment 4		0.38										X	
segment 5		0.25										X	
segment 6		0.88										X	
segment 7	0.53	0.53										X	
Skelly Gulch	0.91	0.79										X	
Soap Creek	8.28	5.02										X	
segment 1		0.93										X	
segment 2		0.71										X	
segment 3		0.91										X	
segment 4		0.31										X	
segment 5		2.15										X	
Teddy Creek	1.78	1.56										X	
Towhead Gulch	2.95	1.64										X	
segment 1		0.71										X	
segment 2		0.93										X	
Virginia Creek	3.44	1.79										X	

Note:

* = Indian Creek Segment 5 was initially found to be eligible. Further evaluation during the suitability phase determined the segment not to be free flowing. The extensive historic and current mining activities have resulted in a channel which does not meet the "natural condition" requirements of free flowing. Numerous placer piles along the segment have resulted in severe modification of the natural channel.

Table D-1
River Segments from Initial Identification Efforts (continued)

River Segment	Total Segment Length (miles)	Length on BLM-administered Lands (miles)	Free Flowing	Outstandingly Remarkable Values								Determination		
				Scenic	Recreation	Geological	Fish	Wildlife	Historic	Cultural	Other	Not Eligible	Eligible	
Whipcracker Gulch	3.81	2.28											X	
		0.18											X	
		0.56											X	
segment 3		1.55											X	
Wood Gulch	1.26	1.26											X	
Yellowstone River	5.04	4.96											X	
segment 1		0.24											X	
segment 2		0.19											X	
segment 3		0.31											X	
segment 4		1.28											X	
segment 5		0.65											X	
segment 6		0.24											X	
segment 7		0.89											X	
segment 8		0.27											X	
segment 9		0.90											X	

APPENDIX J – CULTURAL RESOURCES

USE CATEGORIES FOR MANAGEMENT OF CULTURAL RESOURCES SITES

BLM MANUAL SERIES 8110.4 - .43

.4 Categorizing as to Uses

Categorizing cultural resources according to their potential uses is the culmination of the identification process and the bridge to protection and utilization decisions. Use categories establish what needs to be protected, and when or how use should be authorized. All cultural resources have uses, but not all should be used in the same way. Cultural resources can be allocated to the various recognized use categories even before they are individually identified. The clear advantage in doing this is that it allows Field Office managers to know in advance how to respond to conflicts that arise between specific cultural resources and other land uses. Relative to the national Programmatic Agreement, categorizing resources to uses provides a mechanism for the Field Office manager and the SHPO to confer and concur on how to handle most routine cases of conflict in advance, enabling the Field Office manager to put decisions into effect in the most appropriate and most timely manner.

.41 Allocations to Use Categories

Field Office managers shall allocate to appropriate use categories all cultural properties known and projected to occur in a plan area. Allocations are made in regional plans, local interdisciplinary plans, or project plans, as relevant and timely, and may be applied either to individual properties or to classes of similar properties. Appropriately qualified staff professionals recommend suitable uses for each cultural property or class of properties, considering the properties' characteristics, condition, setting, location, and accessibility, and especially their perceived values and potential uses. A cultural property may be allocated to more than one use category. When allocations have not been made in other planning decisions they should be made during the compliance process for land use authorizations, to allow Field Office managers to analyze needs and develop appropriate mitigation and treatment options. Allocations should be reevaluated and revised, as needed, when circumstances change or new data become available. Allocations should be consistent with historic context documents and State Historic Preservation Plans.

.42 Use Categories

A. Scientific Use. This category applies to any cultural property determined to be available for consideration as the subject of scientific or historical study at the present time, using currently available research techniques.

Study includes methods that would result in the property's physical alteration or destruction. This category applies almost entirely to prehistoric and historic archaeological properties, where the method of use is generally archaeological excavation, controlled surface collection, and/or controlled recordation (data recovery). Recommendations to allocate individual properties to this use must be based on documentation of the kinds of data the property is thought to contain and the data's importance for pursuing specified research topics. Properties in this category need not be conserved in the face of a research or data recovery (mitigation) proposal that would make adequate and appropriate use of the property's research importance.

B. Conservation for Future Use. This category is reserved for any unusual cultural property which, because of scarcity, a research potential that surpasses the current state of the art, singular historic importance, cultural importance, architectural interest, or comparable reasons, is not currently available for consideration as the subject of scientific or historical study that would result in its physical alteration. A cultural property included in this category is deemed worthy of segregation from all other land or resource uses, including cultural resource uses, that would threaten the maintenance of its present condition or setting, as pertinent, and will remain in this use category until specified provisions are met in the future.

C. Traditional Use. This category is to be applied to any cultural resource known to be perceived by a specified social and/or cultural group as important in maintaining the cultural identity, heritage, or well-being of the group. Cultural properties assigned to this category are to be managed in ways that recognize the importance ascribed to them and seek to accommodate their continuing traditional use.

D. Public use. This category may be applied to any cultural property found to be appropriate for use as an interpretive exhibit in place, or for related educational and recreational uses by members of the general public. The category may also be applied to buildings suitable for continued use or adaptive use, for example as staff housing or administrative facilities at a visitor contact or interpretive site, or as shelter along a cross-country ski trail.

E. Experimental Use. This category may be applied to a cultural property judged well-suited for controlled experimental study, to be conducted by BLM or others

concerned with the techniques of managing cultural properties, which would result in the property's alteration, possibly including loss of integrity and destruction of physical elements. Committing cultural properties or the data they contain to loss must be justified in terms of specific information that would be gained and how it would aid in the management of other cultural properties. Experimental study should aim toward understanding the kinds and rates of natural or human-caused deterioration, testing the effectiveness of protection measures, or developing new research or interpretation methods and similar kinds of practical management information. It should not be applied to cultural properties with strong research potential, traditional cultural importance, or good public use potential, if it would significantly diminish those uses.

F. Discharged from Management. This category is assigned to cultural properties that have no remaining identifiable use. Most often these are prehistoric and historic archaeological properties, such as small surface scatters of artifacts or debris, whose limited research potential is effectively exhausted as soon as they have been documented. Also, more complex archaeological properties that have had their salient information

collected and preserved through mitigation or research may be discharged from management, as should cultural properties destroyed by any natural event or human activity. Properties discharged from management remain in the inventory, but they are removed from further management attention and do not constrain other land uses. Particular classes of unrecorded cultural properties may be named and described in advance as dischargeable upon documentation, but specific cultural properties must be inspected in the field and recorded before they may be discharged from management.

.43 Relationship between Evaluation and Allocation

Cultural properties are evaluated with reference to National Register criteria for the purpose of assessing their historical values and their public significance. Such evaluations should be carefully considered when cultural properties are allocated to use categories and decisions are made regarding the appropriateness of National Register nomination and/or long-term preservation. Although preservation and nomination priorities must be weighed on a case-by-case basis, the following table can serve as a general guide to illustrate the relationship between National Register evaluation and allocation to use categories.

TABLE 8110-1. Relationship Among Use Categories, National Register Eligibility, and Preservation/National Register Nomination		
Cultural Resource Use Category	National Register Eligibility	Preservation/National Register Nomination
Scientific Use	Usually eligible	Long-term preservation not critical; medium National Register nomination priority.
Conservation for Future Use	Always eligible	Long-term preservation is required; highest nomination priority.
Traditional Use	May be eligible	Long-term preservation is desirable; nomination priority is determined in consultation with the appropriate cultural group(s).
Public Use	Usually eligible	Long-term preservation is desirable; high nomination priority.
Experimental Use	May be eligible	Long-term preservation not anticipated; low nomination priority.
Discharged from Management	Not eligible	Long-term preservation and management are not considerations; nomination is inappropriate.

INDIAN AFFAIRS: LAWS AND TREATIES

VOL. II, TREATIES

TREATY WITH THE BLACKFEET, 1855.

COMPILED AND EDITED BY CHARLES J. KAPPLER. WASHINGTON : GOVERNMENT
PRINTING OFFICE, 1904.

Oct. 17, 1855. | 11 Stat., 657. | Ratified Apr. 15, 1856. | Proclaimed Apr. 25, 1856.

Articles of agreement and convention made and concluded at the council-ground on the Upper Missouri, near the mouth of the Judith River, in the Territory of Nebraska, this seventeenth day of October, in the year one thousand eight hundred and fifty-five, by and between A. Cumming and Isaac I. Stevens, commissioners duly appointed and authorized, on the part of the United States, and the undersigned chiefs, headmen, and delegates of the following nations and tribes of Indians, who occupy, for the purposes of hunting, the territory on the Upper Missouri and Yellowstone Rivers, and who have permanent homes as follows: East of the Rocky Mountains, the Blackfoot Nation, consisting of the Piegan, Blood, Blackfoot, and Gros Ventres tribes of Indians. West of the Rocky Mountains, the Flathead Nation, consisting of the Flathead, Upper Pend d'Oreille, and Kootenay tribes of Indians, and the Nez Percé tribe of Indians, the said chiefs, headmen and delegates, in behalf of and acting for said nations and tribes, and being duly authorized thereto by them.

ARTICLE 1.

Peace, friendship and amity shall hereafter exist between the United States and the aforesaid nations and tribes of Indians, parties to this treaty, and the same shall be perpetual.

ARTICLE 2.

The aforesaid nations and tribes of Indians, parties to this treaty, do hereby jointly and severally covenant that peaceful relations shall likewise be maintained among themselves in future; and that they will abstain from all hostilities whatsoever against each other, and cultivate mutual good-will and friendship. And the nations and tribes aforesaid to furthermore jointly and severally covenant, that peaceful relations shall be maintained with and that they will abstain from all hostilities whatsoever, excepting in self-defense, against the following-named nations and tribes of Indians, to wit: the Crows, Assineboins, Crees, Snakes, Blackfeet, Sans

ARTICLE 4.

The parties to this treaty agree and consent, that the tract of country lying within lines drawn from the Hell Gate or Medicine Rock Passes, in an easterly direction, to the nearest source of the Muscle Shell River, thence down

Arcs, and Aunce-pa-pas bands of Sioux, and all other neighboring nations and tribes of Indians.

ARTICLE 3.

The Blackfoot Nation consent and agree that all that portion of the country recognized and defined by the treaty of Laramie as Blackfoot territory, lying within lines drawn from the Hell Gate or Medicine Rock Passes in the main range of the Rocky Mountains, in an easterly direction to the nearest source of the Muscle Shell River, thence to the mouth of Twenty-five Yard Creek, thence up the Yellowstone River to its northern source, and thence along the main range of the Rocky Mountains, in a northerly direction, to the point of beginning, shall be a common hunting-ground for ninety-nine years, where all the nations, tribes and bands of Indians, parties to this treaty, may enjoy equal and uninterrupted privileges of hunting, fishing and gathering fruit, grazing animals, curing meat and dressing robes. They further agree that they will not establish villages, or in any other way exercise exclusive rights within ten miles of the northern line of the common hunting-ground, and that the parties to this treaty may hunt on said northern boundary line and within ten miles thereof.

Provided, That the western Indians, parties to this treaty, may hunt on the trail leading down the Muscle Shell to the Yellowstone; the Muscle Shell River being the boundary separating the Blackfoot from the Crow territory.

And provided, That no nation, band, or tribe of Indians, parties to this treaty, nor any other Indians, shall be permitted to establish permanent settlements, or in any other way exercise, during the period above mentioned, exclusive rights or privileges within the limits of the above-described hunting-ground. And provided further, That the rights of the western Indians to a whole or a part of the common hunting-ground, derived from occupancy and possession, shall not be affected by this article, except so far as said rights may be determined by the treaty of Laramie.

said river to its mouth, thence down the channel of the Missouri River to the mouth of Milk River, thence due north to the forty-ninth parallel, thence due west on said parallel to the main range of the Rocky Mountains, and thence southerly along said range to the place of

beginning, shall be the territory of the Blackfoot Nation, over which said nation shall exercise exclusive control, excepting as may be otherwise provided in this treaty. Subject, however, to the provisions of the third article of this treaty, giving the right to hunt, and prohibiting the establishment of permanent villages and the exercise of any exclusive rights within ten miles of the northern line of the common hunting-ground, drawn from the nearest source of the Muscle Shell River to the Medicine Rock Passes, for the period of ninety-nine years. Provided also, That the Assiniboins shall have the right of hunting, in common with the Blackfeet, in the country lying between the aforesaid eastern boundary line, running from the mouth of Milk River to the forty-ninth parallel, and a line drawn from the left bank of the Missouri River, opposite the Round Butte north, to the forty-ninth parallel.

ARTICLE 5.

The parties to this treaty, residing west of the main range of the Rocky Mountains, agree and consent that they will not enter the common hunting ground, nor any part of the Blackfoot territory, or return home, by any pass in the main range of the Rocky Mountains to the north of the Hell Gate or Medicine Rock Passes. And they further agree that they will not hunt or otherwise disturb the game, when visiting the Blackfoot territory for trade or social intercourse.

ARTICLE 6.

The aforesaid nations and tribes of Indians, parties to this treaty, agree and consent to remain within their own respective countries, except when going to or from, or whilst hunting upon, the "common hunting ground," or when visiting each other for the purpose of trade or social intercourse.

ARTICLE 7.

The aforesaid nations and tribes of Indians agree that citizens of the United States may live in and pass unmolested through the countries respectively occupied and claimed by them. And the United States is hereby bound to protect said Indians against depredations and other unlawful acts which white men residing in or passing through their country may commit.

ARTICLE 8.

For the purpose of establishing travelling thoroughfares through their country, and the better to enable the President to execute the provisions of this treaty, the aforesaid nations and tribes do hereby consent and agree, that the United States may, within the countries respectively occupied and claimed by them, construct roads of every description; establish lines of telegraph and military posts; use materials of every description found in the Indian country; build houses for agencies, missions, schools, farms, shops, mills, stations, and for any other purpose for which they may be required, and

permanently occupy as much land as may be necessary for the various purposes above enumerated, including the use of wood for fuel and land for grazing, and that the navigation of all lakes and streams shall be forever free to citizens of the United States.

ARTICLE 9.

In consideration of the foregoing agreements, stipulations, and cessions, and on condition of their faithful observance, the United States agree to expend, annually, for the Piegan, Blood, Blackfoot, and Gros Ventres tribes of Indians, constituting the Blackfoot Nation, in addition to the goods and provisions distributed at the time of signing the treaty, twenty thousand dollars, annually, for ten years, to be expended in such useful goods and provisions, and other articles, as the President, as his discretion, may from time to time determine; and the superintendent, or other proper officer, shall each year inform the President of the wishes of the Indians in relation thereto: Provided, however, That if, in the judgment of the President and Senate, this amount be deemed insufficient, it may be increased not to exceed the sum of thirty-five thousand dollars per year.

ARTICLE 10.

The United States further agree to expend annually, for the benefit of the aforesaid tribes of the Blackfoot Nation, a sum not exceeding fifteen thousand dollars annually, for ten years, in establishing and instructing them in agricultural and mechanical pursuits, and in educating their children, and in any other respect promoting their civilization and Christianization: Provided, however, That to accomplish the objects of this article, the President may, at his discretion, apply any or all the annuities provided for in this treaty: And provided, also, That the President may, at his discretion, determine in what proportions the said annuities shall be divided among the several tribes.

ARTICLE 11.

The aforesaid tribes acknowledge their dependence on the Government of the United States, and promise to be friendly with all citizens thereof, and to commit no depredations or other violence upon such citizens. And should any one or more violate this pledge, and the fact be proved to the satisfaction of the President, the property taken shall be returned, or, in default thereof, or if injured or destroyed, compensation may be made by the Government out of the annuities. The aforesaid tribes are hereby bound to deliver such offenders to the proper authorities for trial and punishment, and are held responsible, in their tribal capacity, to make reparation for depredations so committed.

Nor will they make war upon any other tribes, except in self-defense, but will submit all matter of difference, between themselves and other Indians, to the Government of the United States, through its agents, for

adjustment, and will abide thereby. And if any of the said Indians, parties to this treaty, commit depredations on any other Indians within the jurisdiction of the United States, the same rule shall prevail as that prescribed in this article in case of depredations against citizens. And the said tribes agree not to shelter or conceal offenders against the laws of the United States, but to deliver them up to the authorities for trial.

ARTICLE 12.

It is agreed and understood, by and between the parties to this treaty, that if any nation or tribe of Indians aforesaid, shall violate any of the agreements, obligations, or stipulations, herein contained, the United States may withhold, for such length of time as the President and Congress may determine, any portion or all of the annuities agreed to be paid to said nation or tribe under the ninth and tenth articles of this treaty.

ARTICLE 13.

The nations and tribes of Indians, parties to this treaty, desire to exclude from their country the use of ardent spirits or other intoxicating liquor, and to prevent their people from drinking the same. Therefore it is provided, that any Indian belonging to said tribes who is guilty of bringing such liquor into the Indian country, or who drinks liquor, may have his or her proportion of the annuities withheld from him or her, for such time as the President may determine.

ARTICLE 14.

The aforesaid nations and tribes of Indians, west of the Rocky Mountains, parties to this treaty, do agree, in consideration of the provisions already made for them in existing treaties, to accept the guarantees of the peaceful occupation of their hunting-grounds, east of the Rocky Mountains, and of remuneration for depredations made by the other tribes, pledged to be secured to them in this treaty out of the annuities of said tribes, in full compensation for the concessions which they, in common with the said tribes, have made in this treaty.

The Indians east of the mountains, parties to this treaty, likewise recognize and accept the guarantees of this treaty, in full compensation for the injuries or depredations which have been, or may be committed by the aforesaid tribes, west of the Rocky Mountains.

ARTICLE 15.

The annuities of the aforesaid tribes shall not be taken to pay the debts of individuals.

ARTICLE 16.

This treaty shall be obligatory upon the aforesaid nations and tribes of Indians, parties hereto, from the date hereof, and upon the United States as soon as the same shall be ratified by the President and Senate.

In testimony whereof the said A. Cumming and Isaac I. Stevens, commissioners on the part of the United States, and the undersigned chiefs, headmen, and delegates of the aforesaid nations and tribes of Indians, parties to this treaty, have hereunto set their hands and seals at the place and on the day and year hereinbefore written.

A. Cumming. [L. S.]

Isaac I. Stevens [L. S.]

CuI. Stevens [LS.]

Piegans:

Nee-ti-nee, or "the only chief," now called the Lame Bull, his x mark. [L. S.]

Mountain Chief, his x mark. [L. S.]

Low Horn, his x mark. [L. S.]

Little Gray Head, his x mark. [L. S.]

Little Dog, his x mark. [L. S.]

Big Snake, his x mark. [L. S.]

The Skunk, his x mark. [L. S.]

The Bad Head, his x mark. [L. S.]

Kitch-ee-pone-istah, his x mark. [L. S.]

Middle Sitter, his x mark. [L. S.]

Bloods:

Onis-tay-say-nah-que-im, his x mark. [L. S.]

The Father of All Children, his x mark. [L. S.]

The Bull's Back Fat, his x mark. [L. S.]

Heavy Shield, his x mark. [L. S.]

Nah-tose-onistah, his x mark. [L. S.]

The Calf Shirt, his x mark. [L. S.]

Gros Ventres:

Bear's Shirt, his x mark. [L. S.]

Little Soldier, his x mark. [L. S.]

Star Robe, his x mark. [L. S.]

Sitting Squaw, his x mark. [L. S.]

Weasel Horse, his x mark. [L. S.]

The Rider, his x mark. [L. S.]

Eagle Chief, his x mark. [L. S.]

Heap of Bears, his x mark. [L. S.]

Blackfeet:

The Three Bulls, his x mark. [L. S.]

The Old Kootomais, his x mark. [L. S.]

Pow-ah-que, his x mark. [L. S.]

Chief Rabbit Runner, his x mark. [L. S.]

Nez Percés:

Spotted Eagle, his x mark. [L. S.]

Looking Glass, his x mark. [L. S.]

The Three Feathers, his x mark. [L. S.]

Eagle from the Light, his x mark. [L. S.]

The Lone Bird, his x mark. [L. S.]

Ip-shun-nee-wus, his x mark. [L. S.]

Jason, his x mark. [L. S.]

Wat-ti-wat-ti-we-hinck, his x mark. [L. S.]

White Bird, his x mark. [L. S.]

Stabbing Man, his x mark. [L. S.]

Jesse, his x mark. [L. S.]

Plenty Bears, his x mark. [L. S.]

Flathead Nation:

Victor, his x mark. [L. S.]

Alexander, his x mark. [L. S.]

Moses, his x mark. [L. S.]

Big Canoe, his x mark. [L. S.]

Ambrose, his x mark. [L. S.]

Kootle-cha, his x mark. [L. S.]

Michelle, his x mark. [L. S.]

Francis, his x mark. [L. S.]

Vincent, his x mark. [L. S.]

Andrew, his x mark. [L. S.]

Adolphe, his x mark. [L. S.]

Thunder, his x mark. [L. S.]

Piegans:

Running Rabbit, his x mark, [L. S.]

Chief Bear, his x mark. [L. S.]

The Little White Buffalo, his x mark. [L. S.]

The Big Straw, his x mark. [L. S.]

Flathead:

Bear Track, his x mark. [L. S.]

Little Michelle, his x mark. [L. S.]

Palchinah, his x mark. [L. S.]

Bloods:

The Feather, his x mark. [L. S.]

The White Eagle, his x mark. [L. S.]

Executed in presence of—

James Doty, secretary.

Alfred J. Vaughan, jr.

E. Alw. Hatch, agent for Blackfeet.

Thomas Adams, special agent Flathead Nation.

R. H. Lansdale, Indian agent Flathead Nation.

W. H. Tappan, sub-agent for the Nez Percés.

Blackfoot interpreters:

James Bird,

A. Culbertson,

Benj. Deroche,

Flat Head interpreters:

Benj. Kiser, his x mark,

Witness, James Doty,

Gustavus Sohon,

Nez Percé interpreters:

W. Craig,

Delaware Jim, his x mark,

Witness, James Doty,

A Cree Chief (Broken Arm,) his mark.

Witness, James Doty.

A. J. Hoeckeorsg,

James Croke,

E. S. Wilson,

A. C. Jackson,

Charles Shucette, his x mark.

Christ. P. Higgins,

A. H. Robie,

S. S. Ford, jr.

TREATY WITH THE CROWS, 1868

COMPILED AND EDITED BY CHARLES J. KAPPLER. WASHINGTON : GOVERNMENT
PRINTING OFFICE, 1904.

May 7, 1868. | 15 Stats., 649. | Ratified, July 25, 1868. | Proclaimed, Aug. 12, 1868.

Articles of a treaty made and concluded at Fort Laramie, Dakota Territory, on the seventh day of May, in the year of our Lord one thousand eight hundred and sixty-eight, by and between the undersigned commissioners on the part of the United States, and the undersigned chiefs and head-men of and representing the Crow Indians, they being duly authorized to act in the premises.

ARTICLE 1.

From this day forward peace between the parties to this treaty shall forever continue. The Government of the United States desires peace, and its honor is hereby pledged to keep it. The Indians desire peace, and they hereby pledge their honor to maintain it. If bad men among the whites or among other people, subject to the authority of the United States, shall commit any wrong upon the person or property of the Indians, the United States will, upon proof made to the agent and forwarded to the Commissioner of Indian Affairs at Washington City, proceed at once to cause the offender to be arrested and punished according to the laws of the United States, and also re-imburse the injured person for the loss sustained.

If bad men among the Indians shall commit a wrong or depredation upon the person or property of any one, white, black, or Indian, subject to the authority of the United States and at peace therewith, the Indians herein named solemnly agree that they will, on proof made to their agent and notice by him, deliver up the wrong-doer to the United States, to be tried and punished according to its laws; and in case they refuse willfully so to do the person injured shall be re-imbursed for his loss from the annuities or other moneys due or to become due to them under this or other treaties made with the United States. And the President, on advising with the Commissioner of Indian Affairs, shall prescribe such rules and regulations for ascertaining damages under the provisions of this article as in his judgment may be proper. But no such damages shall be adjusted and paid until thoroughly examined and passed upon by the Commissioner of Indian Affairs, and no one sustaining loss while violating, or because of his violating, the provisions of this treaty or the laws of the United States shall be re-imbursed therefor.

ARTICLE 2.

The United States agrees that the following district of country, to wit: commencing where the 107th degree of longitude west of Greenwich crosses the south boundary of Montana Territory; thence north along said 107th

meridian to the mid-channel of the Yellowstone River; thence up said mid-channel of the Yellowstone to the point where it crosses the said southern boundary of Montana, being the 45th degree of north latitude; and thence east along said parallel of latitude to the place of beginning, shall be, and the same is, set apart for the absolute and undisturbed use and occupation of the Indians herein named, and for such other friendly tribes or individual Indians as from to time they may be willing, with the consent of the United States, to admit amongst them; and the United States now solemnly agrees that no persons, except those herein designated and authorized so to do, and except such officers, agents, and employes of the Government as may be authorized to enter upon Indian reservations in discharge of duties enjoined by law, shall ever be permitted to pass over, settle upon, or reside in the territory described in this article for the use of said Indians, and henceforth they will, and do hereby, relinquish all title, claims, or rights in and to any portion of the territory of the United States, except such as is embraced within the limits aforesaid.

ARTICLE 3.

The United States agrees, at its own proper expense, to construct on the south side of the Yellowstone, near Otter Creek, a warehouse or store-room for the use of the agent in storing goods belonging to the Indians, to cost not exceeding twenty-five hundred dollars; an agency-building for the residence of the agent, to cost not exceeding three thousand dollars; a residence for the physician, to cost not more than three thousand dollars; and five other buildings, for a carpenter, farmer, blacksmith, miller, and engineer, each to cost not exceeding two thousand dollars; also a school-house or mission-building, so soon as a sufficient number of children can be induced by the agent to attend school, which shall not cost exceeding twenty-five hundred dollars.

The United States agrees further to cause to be erected on said reservation, near the other buildings herein authorized, a good steam circular saw-mill, with a grist-mill and shingle-machine attached, the same to cost not exceeding eight thousand dollars.

ARTICLE 4.

The Indians herein named agree, when the agency-house and other buildings shall be constructed on the reservation named, they will make said reservation their permanent home, and they will make no permanent settlement elsewhere, but they shall have the right to hunt on the unoccupied lands of the United States so

long as game may be found thereon, and as long as peace subsists among the whites and Indians on the borders of the hunting districts.

ARTICLE 5.

The United States agrees that the agent for said Indians shall in the future make his home at the agency-building; that he shall reside among them, and keep an office open at all times for the purpose of prompt and diligent inquiry into such matters of complaint, by and against the Indians, as may be presented for investigation under the provisions of their treaty stipulations, as also for the faithful discharge of other duties enjoined on him by law. In all cases of depredation on person or property, he shall cause the evidence to be taken in writing and forwarded, together with his finding, to the Commissioner of Indian Affairs, whose decision shall be binding on the parties to this treaty.

ARTICLE 6.

If any individual belonging to said tribes of Indians, or legally incorporated with them, being the head of a family, shall desire to commence farming, he shall have the privilege to select, in the presence and with the assistance of the agent then in charge, a tract of land within said reservation, not exceeding three hundred and twenty acres in extent, which tract, when so selected, certified, and recorded in the "land book," as herein directed, shall cease to be held in common, but the same may be occupied and held in the exclusive possession of the person selecting it, and of his family, so long as he or they may continue to cultivate it.

Any person over eighteen years of age, not being the head of a family, may in like manner select and cause to be certified to him or her, for purposes of cultivation, a quantity of land not exceeding eighty acres in extent, and thereupon be entitled to the exclusive possession of the same as above directed.

For each tract of land so selected a certificate, containing a description thereof and the name of the person selecting it, with a certificate endorsed thereon that the same has been recorded, shall be delivered to the party entitled to it by the agent, after the same shall have been recorded by him in a book to be kept in his office, subject to inspection, which said book shall be known as the "Crow land book."

The President may at any time order a survey of the reservation, and, when so surveyed, Congress shall provide for protecting the rights of settlers in their improvements, and may fix the character of the title held by each. The United States may pass such laws on the subject of alienation and descent of property as between Indians, and on all subjects connected with the government of the Indians on said reservations and the internal police thereof, as may be thought proper.

ARTICLE 7.

In order to insure the civilization of the tribe entering into this treaty, the necessity of education is admitted, especially by such of them as are, or may be, settled on said agricultural reservation; and they therefore pledge themselves to compel their children, male and female, between the ages of six and sixteen years, to attend school; and it is hereby made the duty of the agent for said Indians to see that this stipulation is strictly complied with; and the United States agrees that for every thirty children, between said ages, who can be induced or compelled to attend school, a house shall be provided, and a teacher, competent to teach the elementary branches of an English education, shall be furnished, who will reside among said Indians, and faithfully discharge his or her duties as a teacher. The provisions of this article to continue for twenty years.

ARTICLE 8.

When the head of a family or lodge shall have selected lands and received his certificate as above directed, and the agent shall be satisfied that he intends in good faith to commence cultivating the soil for a living, he shall be entitled to receive seed and agricultural implements for the first year in value one hundred dollars, and for each succeeding year he shall continue to farm, for a period of three years more, he shall be entitled to receive seed and implements as aforesaid in value twenty-five dollars per annum.

And it is further stipulated that such persons as commence farming shall receive instructions from the farmer herein provided for, and whenever more than one hundred persons shall enter upon the cultivation of the soil, a second blacksmith shall be provided, with such iron, steel, and other material as may be required.

ARTICLE 9.

In lieu of all sums of money or other annuities provided to be paid to the Indians herein named, under any and all treaties heretofore made with them, the United States agrees to deliver at the agency house, on the reservation herein provided for, on the first day of September of each year for thirty years, the following articles, to wit:

For each male person, over fourteen years of age, a suit of good substantial woolen clothing, consisting of coat, hat, pantaloons, flannel shirt, and a pair of woolen socks.

For each female, over twelve years of age, a flannel skirt, or the goods necessary to make it, a pair of woolen hose, twelve yards of calico, and twelve yards of cotton domestics.

For the boys and girls under the ages named, such flannel and cotton goods as may be needed to make each a suit as aforesaid, together with a pair of woollen hose for each.

And in order that the Commissioner of Indian Affairs may be able to estimate properly for the articles herein named, it shall be the duty of the agent, each year, to forward to him a full and exact census of the Indians, on which the estimate from year to year can be based.

And, in addition to the clothing herein named, the sum of ten dollars shall be annually appropriated for each Indian roaming, and twenty dollars for each Indian engaged in agriculture, for a period of ten years, to be used by the Secretary of the Interior in the purchase of such articles as, from time to time, the condition and necessities of the Indians may indicate to be proper. And if, at any time within the ten years, it shall appear that the amount of money needed for clothing, under this article, can be appropriated to better uses for the tribe herein named, Congress may, by law, change the appropriation to other purposes; but in no event shall the amount of this appropriation be withdrawn or discontinued for the period named.

And the President shall annually detail an officer of the Army to be present and attest the delivery of all the goods herein named to the Indians, and he shall inspect and report on the quantity and quality of the goods and the manner of their delivery; and it is expressly stipulated that each Indian over the age of four years, who shall have removed to and settled permanently upon said reservation, and complied with the stipulations of this treaty, shall be entitled to receive from the United States, for the period of four years after he shall have settled upon said reservation, one pound of meat and one pound of flour per day, provided the Indians cannot furnish their own subsistence at an earlier date. And it is further stipulated that the United States will furnish and deliver to each lodge of Indians, or family of persons legally incorporated with them, who shall remove to the reservation herein described, and commence farming, one good American cow and one good, well-broken pair of American oxen, within sixty days after such lodge or family shall have so settled upon said reservation.

ARTICLE 10.

The United States hereby agrees to furnish annually to the Indians the physician, teachers, carpenter, miller, engineer, farmer, and blacksmiths as herein contemplated, and that such appropriations shall be made from time to time, on the estimates of the Secretary of the Interior, as will be sufficient to employ such persons.

ARTICLE 11.

No treaty for the cession of any portion of the reservation herein described, which may be held in common, shall be of any force or validity as against the said Indians unless executed and signed by, at least, a majority of all the adult male Indians occupying or

interested in the same, and no cession by the tribe shall be understood or construed in such a manner as to deprive, without his consent, any individual member of the tribe of his right to any tract of land selected by him as provided in Article 6 of this treaty.

ARTICLE 12.

It is agreed that the sum of five hundred dollars annually, for three years from the date when they commence to cultivate a farm, shall be expended in presents to the ten persons of said tribe who, in the judgment of the agent, may grow the most valuable crops for the respective year.

W. T. Sherman,
Lieutenant-General.

Wm. S. Harney,
Brevet Major-General and Peace Commissioner.

Alfred H. Terry,
Brevet Major-General.

C. C. Augur,
Brevet Major-General.

John B. Sanborn.

S. F. Tappan.

Ashton S. H. White, Secretary.

Che-ra-pee-ish-ka-te, Pretty Bull, his x mark. [SEAL.]

Chat-sta-he, Wolf Bow, his x mark. [SEAL.]

Ah-be-che-se, Mountain Tail, his x mark. [SEAL.]

Kam-ne-but-sa, Black Foot, his x mark. [SEAL.]

De-sal-ze-cho-se, White Horse, his x mark. [SEAL.]

Chin-ka-she-arache, Poor Elk, his x mark. [SEAL.]

E-sa-woor, Shot in the Jaw, his x mark. [SEAL.]

E-sha-chose, White Forehead, his x mark. [SEAL.]

—Roo-ka, Pounded Meat, his x mark. [SEAL.]

De-ka-ke-up-se, Bird in the Neck, his x mark. [SEAL.]

Me-na-che, The Swan, his x mark. [SEAL.]

Attest:

George B. Wills, phonographer.

John D. Howland.

Alex. Gardner.

David Knox.

Chas. Freeman.

Jas. C. O'Connor.

TREATY WITH THE SHOSHONI—NORTHWESTERN BANDS, 1863.

Compiled and edited by Charles J. Kappler. Washington : Government Printing Office, 1904.

JULY 30, 1863. | 13 STATS., 663. | RATIFIED MAR. 7, 1864 | PROCLAIMED JAN. 17, 1865.

Articles of agreement made at Box Elder, in Utah Territory, this thirtieth day of July, A. D. one thousand eight hundred and sixty-three, by and between the United States of America, represented by Brigadier-General P. Edward Connor, commanding the military district of Utah, and James Duane Doty, commissioner, and the northwestern bands of the Shoshonee Indians, represented by their chiefs and warriors:

ARTICLE 1.

It is agreed that friendly and amicable relations shall be re-established between the bands of the Shoshonee Nation, parties hereto, and the United States, and it is declared that a firm and perpetual peace shall be henceforth maintained between the said bands and the United States.

ARTICLE 2.

The treaty concluded at Fort Bridger on the 2nd day of July, 1863; between the United States and the Shoshonee Nation, being read and fully interpreted and explained to the said chiefs and warriors, they do hereby give their full and free assent to all of the provisions of said treaty, and the same are hereby adopted as a part of this agreement, and the same shall be binding upon the parties hereto.

ARTICLE 3.

In consideration of the stipulations in the preceding articles, the United States agree to increase the annuity to the Shoshonee Nation five thousand dollars, to be paid in the manner provided in said treaty. And the said northwestern bands hereby acknowledge to have received of the United States, at the signing of these articles, provisions and goods to the amount of two thousand dollars, to relieve their immediate necessities, the said bands having been reduced by the war to a state of utter destitution.

ARTICLE 4.

The country claimed by Pokatello, for himself and his people, is bounded on the west by Raft River and on the east by the Porteneuf Mountains.

ARTICLE 5.

Nothing herein contained shall be construed or taken to admit any other or greater title or interest in the lands embraced within the territories described in said treaty in said tribes or bands of Indians than existed in them upon the acquisition of said territories from Mexico by the laws thereof.

Done at Box Elder, this thirtieth day of July, A. D. 1863.

*James Duane Doty,
Governor and acting superintendent of Indian
affairs in Utah Territory.*

*P. Edw. Connor,
Brigadier-General U. S. Volunteers, commanding
District of Utah.*

Pokatello, his x mark, chief.

Toomontso, his x mark, chief.

Sanpitz, his x mark, chief.

Tosowitz, his x mark, chief.

Yahnokay, his x mark, chief.

Weerahsoop, his x mark, chief.

Pahragoosahd, his x mark, chief.

Tahkwetoonah, his x mark, chief.

*Omashee, (John Pokatelloaposs brother,) his x mark,
chief.*

Witnesses:

Robt. Pollock, colonel Third Infantry, C. V.

M. G. Lewis, captain Third Infantry, C. V.

S. E. Jocelyn, first lieutenant Third Infantry, C. V.

Jos. A. Gebone, Indian interpreter.

John Barnard, jr., his x mark, special interpreter.

Willis H. Boothe, special interpreter.

Horace Wheat

TREATY WITH THE FLATHEADS, ETC., 1855.

JULY 16, 1855. | 12 STATS., 975. | RATIFIED MAR. 8, 1859. | PROCLAIMED APR. 18, 1859.

Articles of agreement and convention made and concluded at the treaty-ground at Hell Gate, in the Bitter Root Valley, this sixteenth day of July, in the year one thousand eight hundred and fifty-five, by and between Isaac I. Stevens, governor and superintendent of Indian affairs for the Territory of Washington, on the part of the United States, and the undersigned chiefs, head-men, and delegates of the confederated tribes of the Flathead, Kootenay, and Upper Pend d' Oreilles Indians, on behalf of and acting for said confederated tribes, and being duly authorized thereto by them. It being understood and agreed that the said confederated tribes do hereby constitute a nation, under the name of the Flathead Nation, with Victor, the head chief of the Flathead tribe, as the head chief of the said nation, and that the several chiefs, head-men, and delegates, whose names are signed to this treaty, do hereby, in behalf of their respective tribes, recognise Victor as said head chief.

ARTICLE 1.

The said confederated tribe of Indians hereby cede, relinquish, and convey to the United States all their right, title, and interest in and to the country occupied or claimed by them, bounded and described as follows, to wit: Commencing on the main ridge of the Rocky Mountains at the forty-ninth (49th) parallel of latitude, thence westwardly on that parallel to the divide between the Flat-bow or Kootenay River and Clarke's Fork, thence southerly and southeasterly along said divide to the one hundred and fifteenth degree of longitude, (115°,) thence in a southwesterly direction to the divide between the sources of the St. Regis Borgia and the Coeur d' Alene Rivers, thence southeasterly and southerly along the main ridge of the Bitter Root Mountains to the divide between the head-waters of the Koos-koos-kee River and of the southwestern fork of the Bitter Root River, thence easterly along the divide separating the waters of the several tributaries of the Bitter Root River from the waters flowing into the Salmon and Snake Rivers to the main ridge of the Rocky Mountains, and thence northerly along said main ridge to the place of beginning.

ARTICLE 2.

There is, however, reserved from the lands above ceded, for the use and occupation of the said confederated tribes, and as a general Indian reservation, upon which may be placed other friendly tribes and bands of Indians of the Territory of Washington who may agree to be consolidated with the tribes parties to this treaty, under the common designation of the Flathead Nation, with Victor, head chief of the Flathead tribe, as the head chief of the nation, the tract of land included within the following boundaries, to wit:

Commencing at the source of the main branch of the Jocko River; thence along the divide separating the waters flowing into the Bitter Root River from those flowing into the Jocko to a point on Clarke's Fork between the Camash and Horse Prairies; thence northerly to, and along the divide bounding on the west the Flathead River, to a point due west from the point half way in latitude between the northern and southern extremities of the Flathead Lake; thence on a due east course to the divide whence the Crow, the Prune, the Soni-el-em and the Jocko Rivers take their rise, and thence southerly along said divide to the place of beginning.

All which tract shall be set apart, and, so far as necessary, surveyed and marked out for the exclusive use and benefit of said confederated tribes as an Indian reservation. Nor shall any white man, excepting those in the employment of the Indian department, be permitted to reside upon the said reservation without permission of the confederated tribes, and the superintendent and agent. And the said confederated tribes agree to remove to and settle upon the same within one year after the ratification of this treaty. In the meantime it shall be lawful for them to reside upon any ground not in the actual claim and occupation of citizens of the United States, and upon any ground claimed or occupied, if with the permission of the owner or claimant.

Guaranteeing however the right to all citizens of the United States to enter upon and occupy as settlers any lands not actually occupied and cultivated by said Indians at this time, and not included in the reservation above named. And provided, That any substantial improvements heretofore made by any Indian, such as fields enclosed and cultivated and houses erected upon the lands hereby ceded, and which he may be compelled to abandon in consequence of this treaty, shall be valued under the direction of the President of the United States, and payment made therefor in money, or improvements of an equal value be made for said Indian upon the reservation; and no Indian will be required to abandon the improvements aforesaid, now occupied by him, until their value in money or improvements of an equal value shall be furnished him as aforesaid.

ARTICLE 3.

And provided, That if necessary for the public convenience roads may be run through the said reservation; and, on the other hand, the right of way with free access from the same to the nearest public highway is secured to them, as also the right in common with citizens of the United States to travel upon all public highways.

The exclusive right of taking fish in all the streams running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at

all usual and accustomed places, in common with citizens of the Territory, and of erecting temporary buildings for curing; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.

ARTICLE 4.

In consideration of the above cession, the United States agree to pay to the said confederated tribes of Indians, in addition to the goods and provisions distributed to them at the time of signing this treaty the sum of one hundred and twenty thousand dollars, in the following manner—that is to say: For the first year after the ratification hereof, thirty-six thousand dollars, to be expended under the direction of the President, in providing for their removal to the reservation, breaking up and fencing farms, building houses for them, and for such other objects as he may deem necessary. For the next four years, six thousand dollars each year; for the next five years, five thousand dollars each year; for the next five years, four thousand dollars each year; and for the next five years, three thousand dollars each year.

All which said sums of money shall be applied to the use and benefit of the said Indians, under the direction of the President of the United States, who may from time to time determine, at his discretion, upon what beneficial objects to expend the same for them, and the superintendent of Indian affairs, or other proper officer, shall each year inform the President of the wishes of the Indians in relation thereto.

ARTICLE 5.

The United States further agree to establish at suitable points within said reservation, within one year after the ratification hereof, an agricultural and industrial school, erecting the necessary buildings, keeping the same in repair, and providing it with furniture, books, and stationery, to be located at the agency, and to be free to the children of the said tribes, and to employ a suitable instructor or instructors. To furnish one blacksmith shop, to which shall be attached a tin and gun shop; one carpenter's shop; one wagon and plough-maker's shop; and to keep the same in repair, and furnished with the necessary tools. To employ two farmers, one blacksmith, one tinner, one gunsmith, one carpenter, one wagon and plough maker, for the instruction of the Indians in trades, and to assist them in the same. To erect one saw-mill and one flouring-mill, keeping the same in repair and furnished with the necessary tools and fixtures, and to employ two millers. To erect a hospital, keeping the same in repair, and provided with the necessary medicines and furniture, and to employ a physician; and to erect, keep in repair, and provide the necessary furniture the buildings required for the accommodation of said employees. The said buildings and establishments to be maintained and kept in repair as aforesaid, and the employees to be kept in service for the period of twenty years.

And in view of the fact that the head chiefs of the said confederated tribes of Indians are expected and will be called upon to perform many services of a public character, occupying much of their time, the United States further agree to pay to each of the Flathead, Kootenay, and Upper Pend d'Oreilles tribes five hundred dollars per year, for the term of twenty years after the ratification hereof, as a salary for such persons as the said confederated tribes may select to be their head chiefs, and to build for them at suitable points on the reservation a comfortable house, and properly furnish the same, and to plough and fence for each of them ten acres of land. The salary to be paid to, and the said houses to be occupied by, such head chiefs so long as they may be elected to that position by their tribes, and no longer. And all the expenditures and expenses contemplated in this article of this treaty shall be defrayed by the United States, and shall not be deducted from the annuities agreed to be paid to said tribes. Nor shall the cost of transporting the goods for the annuity payments be a charge upon the annuities, but shall be defrayed by the United States.

ARTICLE 6.

The President may from time to time, at his discretion, cause the whole, or such portion of such reservation as he may think proper, to be surveyed into lots, and assign the same to such individuals or families of the said confederated tribes as are willing to avail themselves of the privilege, and will locate on the same as a permanent home, on the same terms and subject to the same regulations as are provided in the sixth article of the treaty with the Omahas, so far as the same may be applicable.

ARTICLE 7.

The annuities of the aforesaid confederated tribes of Indians shall not be taken to pay the debts of individuals.

ARTICLE 8.

The aforesaid confederated tribes of Indians acknowledge their dependence upon the Government of the United States, and promise to be friendly with all citizens thereof, and pledge themselves to commit no depredations upon the property of such citizens. And should any one or more of them violate this pledge, and the fact be satisfactorily proved before the agent, the property taken shall be returned, or, in default thereof, or if injured or destroyed, compensation may be made by the Government out of the annuities. Nor will they make war on any other tribe except in self-defence, but will submit all matters of difference between them and other Indians to the Government of the United States, or its agent, for decision, and abide thereby. And if any of the said Indians commit any depredations on any other Indians within the jurisdiction of the United States, the same rule shall prevail as that prescribed in this article, in case of depredations against citizens. And the said tribes agree not to shelter or conceal offenders against

the laws of the United States, but to deliver them up to the authorities for trial.

ARTICLE 9.

The said confederated tribes desire to exclude from their reservation the use of ardent spirits, and to prevent their people from drinking the same; and therefore it is provided that any Indian belonging to said confederated tribes of Indians who is guilty of bringing liquor into said reservation, or who drinks liquor, may have his or her proportion of the annuities withheld from him or her for such time as the President may determine.

ARTICLE 10.

The United States further agree to guaranty the exclusive use of the reservation provided for in this treaty, as against any claims which may be urged by the Hudson Bay Company under the provisions of the treaty between the United States and Great Britain of the fifteenth of June, eighteen hundred and forty-six, in consequence of the occupation of a trading-post on the Pru-in River by the servants of that company.

ARTICLE 11.

It is, moreover, provided that the Bitter Root Valley, above the Loo-lo Fork, shall be carefully surveyed and examined, and if it shall prove, in the judgment of the President, to be better adapted to the wants of the Flathead tribe than the general reservation provided for in this treaty, then such portions of it as may be necessary shall be set apart as a separate reservation for the said tribe. No portion of the Bitter Root Valley, above the Loo-lo Fork, shall be opened to settlement until such examination is had and the decision of the President made known.

ARTICLE 12.

This treaty shall be obligatory upon the contracting parties as soon as the same shall be ratified by the President and Senate of the United States.

In testimony whereof, the said Isaac I. Stevens, governor and superintendent of Indian affairs for the Territory of Washington, and the undersigned head chiefs, chiefs and principal men of the Flathead, Kootenay, and Upper Pend d'Oreilles tribes of Indians, have hereunto set their

hands and seals, at the place and on the day and year hereinbefore written.

Isaac I. Stevens, [L. S.]

Governor and Superintendent Indian Affairs W. T.

Victor, head chief of the Flathead Nation, his x mark. [L. S.]

Alexander, chief of the Upper Pend d'Oreilles, his x mark. [L. S.]

Michelle, chief of the Kootenays, his x mark. [L. S.]

Ambrose, his x mark. [L. S.]

Pah-soh, his x mark. [L. S.]

Bear Track, his x mark. [L. S.]

Adolphe, his x mark. [L. S.]

Thunder, his x mark. [L. S.]

Big Canoe, his x mark. [L. S.]

Kootel Chah, his x mark. [L. S.]

Paul, his x mark. [L. S.]

Andrew, his x mark. [L. S.]

Michelle, his x mark. [L. S.]

Battiste, his x mark. [L. S.]

Kootenays.

Gun Flint, his x mark. [L. S.]

Little Michelle, his x mark. [L. S.]

Paul See, his x mark. [L. S.]

Moses, his x mark. [L. S.]

James Doty, secretary.

R. H. Lansdale, Indian Agent.

W. H. Tappan, sub Indian Agent.

Henry R. Crosire,

Gustavus Sohon, Flathead Interpreter.

A. J. Hoecken, sp. mis.

William Craig.

TREATY OF FORT LARAMIE WITH SIOUX, ETC., 1851.

COMPILED AND EDITED BY CHARLES J. KAPPLER. WASHINGTON : GOVERNMENT PRINTING OFFICE, 1904.

Sept. 17, 1851. | 11 Stats., p. 749.

Articles of a treaty made and concluded at Fort Laramie, in the Indian Territory, between D. D. Mitchell, superintendent of Indian affairs, and Thomas Fitzpatrick, Indian agent, commissioners specially appointed and authorized by the President of the United States, of the first part, and the chiefs, headmen, and braves of the following Indian nations, residing south of the Missouri River, east of the Rocky Mountains, and north of the lines of Texas and New Mexico, viz, the Sioux or Dahcotahs, Cheyennes, Arrapahoes, Crows. Assinaboines, Gros-Ventre Mandans, and Arrickaras, parties of the second part, on the seventeenth day of September, A. D. one thousand eight hundred and fifty-one.

ARTICLE 1.

The aforesaid nations, parties to this treaty. having assembled for the purpose of establishing and confirming peaceful relations amongst themselves, do hereby covenant and agree to abstain in future from all hostilities whatever against each other, to maintain good faith and friendship in all their mutual intercourse, and to make an effective and lasting peace.

ARTICLE 2.

The aforesaid nations do hereby recognize the right of the United States Government to establish roads, military and other posts, within their respective territories.

ARTICLE 3.

In consideration of the rights and privileges acknowledged in the preceding article, the United States bind themselves to protect the aforesaid Indian nations against the commission of all depredations by the people of the said United States, after the ratification of this treaty.

ARTICLE 4.

The aforesaid Indian nations do hereby agree and bind themselves to make restitution or satisfaction for any wrongs committed, after the ratification of this treaty, by any band or individual of their people, on the people of the United States, whilst lawfully residing in or passing through their respective territories.

ARTICLE 5.

The aforesaid Indian nations do hereby recognize and acknowledge the following tracts of country, included within the metes and boundaries hereinafter designated, as their respective territories, viz:

The territory of the Sioux or Dahcotah Nation, commencing the mouth of the White Earth River, on the Missouri River: thence in a southwesterly direction to the forks of the Platte River: thence up the north fork of the Platte River to a point known as the Red Butte, or where the road leaves the river; thence along the range of mountains known as the Black Hills, to the headwaters of Heart River; thence down Heart River to its mouth; and thence down the Missouri River to the place of beginning.

The territory of the Gros Ventre, Mandans, and Arrickaras Nations, commencing at the mouth of Heart River; thence up the Missouri River to the mouth of the Yellowstone River; thence up the Yellowstone River to the mouth of Powder River in a southeasterly direction, to the headwaters of the Little Missouri River; thence along the Black Hills to the head of Heart River, and thence down Heart River to the place of beginning.

The territory of the Assinaboin Nation, commencing at the mouth of Yellowstone River; thence up the Missouri River to the mouth of the Muscle-shell River; thence from the mouth of the Muscle-shell River in a southeasterly direction until it strikes the headwaters of

^aThis treaty as signed was ratified by the Senate with an amendment changing the annuity in Article 7 from fifty to ten years, subject to acceptance by the tribes. Assent of all tribes except the Crows was procured (see Upper Platte C., 570, 1853, Indian Office) and in subsequent agreements this treaty has been recognized as in force (see post p. 776).

Big Dry Creek; thence down that creek to where it empties into the Yellowstone River, nearly opposite the mouth of Powder River, and thence down the Yellowstone River to the place of beginning.

The territory of the Blackfoot Nation, commencing at the mouth of Muscle-shell River; thence up the Missouri River to its source; thence along the main range of the Rocky Mountains, in a southerly direction, to the headwaters of the northern source of the Yellowstone River; thence down the Yellowstone River to the mouth of Twenty-five Yard Creek; thence across to the headwaters of the Muscle-shell River, and thence down the Muscle-shell River to the place of beginning.

The territory of the Crow Nation, commencing at the mouth of Powder River on the Yellowstone; thence up Powder River to its source; thence along the main range of the Black Hills and Wind River Mountains to the

head-waters of the Yellowstone River; thence down the Yellowstone River to the mouth of Twenty-five Yard Creek; thence to the head waters of the Muscle-shell River; thence down the Muscle-shell River to its mouth; thence to the head-waters of Big Dry Creek, and thence to its mouth.

The territory of the Cheyennes and Arrapahoes, commencing at the Red Butte, or the place where the road leaves the north fork of the Platte River; thence up the north fork of the Platte River to its source; thence along the main range of the Rocky Mountains to the head-waters of the Arkansas River; thence down the Arkansas River to the crossing of the Santa Fé road; thence in a northwesterly direction to the forks of the Platte River, and thence up the Platte River to the place of beginning.

It is, however, understood that, in making this recognition and acknowledgement, the aforesaid Indian nations do not hereby abandon or prejudice any rights or claims they may have to other lands; and further, that they do not surrender the privilege of hunting, fishing, or passing over any of the tracts of country heretofore described.

ARTICLE 6.

The parties to the second part of this treaty having selected principals or head-chiefs for their respective nations, through whom all national business will hereafter be conducted, do hereby bind themselves to sustain said chiefs and their successors during good behavior.

ARTICLE 7.

In consideration of the treaty stipulations, and for the damages which have or may occur by reason thereof to the Indian nations, parties hereto, and for their maintenance and the improvement of their moral and social customs, the United States bind themselves to deliver to the said Indian nations the sum of fifty thousand dollars per annum for the term of ten years, with the right to continue the same at the discretion of the President of the United States for a period not exceeding five years thereafter, in provisions, merchandise, domestic animals, and agricultural implements, in such proportions as may be deemed best adapted to their condition by the President of the United States, to be distributed in proportion to the population of the aforesaid Indian nations.

ARTICLE 8.

It is understood and agreed that should any of the Indian nations, parties to this treaty, violate any of the provisions thereof, the United States may withhold the whole or a portion of the annuities mentioned in the

preceding article from the nation so offending, until, in the opinion of the President of the United States, proper satisfaction shall have been made.

In testimony whereof the said D. D. Mitchell and Thomas Fitzpatrick commissioners as aforesaid, and the chiefs, headmen, and braves, parties hereto, have set their hands and affixed their marks, on the day and at the place first above written.

D. D. Mitchell

Thomas Fitzpatrick

Commissioners.

Sioux:

Mah-toe-wha-you-whey, his x mark.

Mah-kah-toe-zah-zah, his x mark.

Bel-o-ton-kah-tan-ga, his x mark.

Nah-ka-pah-gi-gi, his x mark.

Mak-toe-sah-bi-chis, his x mark.

Meh-wha-tah-ni-hans-kah, his x mark.

Cheyennes:

Wah-ha-nis-satta, his x mark.

Voist-ti-toe-vetz, his x mark.

Nahk-ko-me-ien, his x mark.

Koh-kah-y-wh-cum-est, his x mark.

Arrapahoes:

Bè-ah-té-a-qui-sah, his x mark.

Neb-ni-bah-seh-it, his x mark.

Beh-kah-jay-beth-sah-es, his x mark.

Crows:

Arra-tu-ri-sash, his x mark.

Doh-chepit-seh-chi-es, his x mark.

Assinaboines:

Mah-toe-wit-ko, his x mark.

Toe-tah-ki-eh-nan, his x mark.

Mandans and Gros Ventres:

Nochk-pit-shi-toe-pish, his x mark.

She-oh-mant-ho, his x mark.

Arickarees:

Koun-hei-ti-shan, his x mark.

Bi-atch-tah-wetch, his x mark.

In the presence of—

A. B. Chambers, secretary.

S. Cooper, colonel, U. S. Army.

R. H. Chilton, captain, First Drags.

Thomas Duncan, captain, Mounted Riflemen.

Thos. G. Rhett, brevet captain R. M. R.

W. L. Elliott, first lieutenant R. M. R.

C. Campbell, interpreter for Sioux.

John S. Smith, interpreter for Cheyennes.

Robert Meldrum, interpreter for the Crows.

H. Culbertson, interpreter for Assiniboinés and Gros Ventres.

Francois L'Etalie, interpreter for Arick arees.

John Pizelle, interpreter for the Arrapahoes.

B. Gratz Brown.

Robert Campbell.

Edmond F. Chouteau.

TREATY WITH THE SHOSHONI—NORTHWESTERN BANDS, 1863.

COMPILED AND EDITED BY CHARLES J. KAPPLER. WASHINGTON : GOVERNMENT
PRINTING OFFICE, 1904

July 30, 1863. | 13 Stats., 663. | Ratified Mar. 7, 1864 | Proclaimed Jan. 17, 1865.

Articles of agreement made at Box Elder, in Utah Territory, this thirtieth day of July, A. D. one thousand eight hundred and sixty-three, by and between the United States of America, represented by Brigadier-General P. Edward Connor, commanding the military district of Utah, and James Duane Doty, commissioner, and the northwestern bands of the Shoshonee Indians, represented by their chiefs and warriors:

ARTICLE 1.

It is agreed that friendly and amicable relations shall be re-established between the bands of the Shoshonee Nation, parties hereto, and the United States, and it is declared that a firm and perpetual peace shall be henceforth maintained between the said bands and the United States.

ARTICLE 2.

The treaty concluded at Fort Bridger on the 2nd day of July, 1863; between the United States and the Shoshonee Nation, being read and fully interpreted and explained to the said chiefs and warriors, they do hereby give their full and free assent to all of the provisions of said treaty, and the same are hereby adopted as a part of this agreement, and the same shall be binding upon the parties hereto.

ARTICLE 3.

In consideration of the stipulations in the preceding articles, the United States agree to increase the annuity to the Shoshonee Nation five thousand dollars, to be paid in the manner provided in said treaty. And the said northwestern bands hereby acknowledge to have received of the United States, at the signing of these articles, provisions and goods to the amount of two thousand dollars, to relieve their immediate necessities, the said bands having been reduced by the war to a state of utter destitution.

ARTICLE 4.

The country claimed by Pokatello, for himself and his people, is bounded on the west by Raft River and on the east by the Porteneuf Mountains.

ARTICLE 5.

Nothing herein contained shall be construed or taken to admit any other or greater title or interest in the lands embraced within the territories described in said treaty in said tribes or bands of Indians than existed in them upon the acquisition of said territories from Mexico by the laws thereof.

Done at Box Elder, this thirtieth day of July, A. D. 1863.

James Duane Doty,
Governor and acting superintendent of Indian
affairs in Utah Territory.

P. Edw. Connor,
Brigadier-General U. S. Volunteers, commanding
District of Utah.

Pokatello, his x mark, chief.

Toomontso, his x mark, chief.

Sanpitz, his x mark, chief.

Tosowitz, his x mark, chief.

Yahnoway, his x mark, chief.

Weerahsoop, his x mark, chief.

Pahragoosahd, his x mark, chief.

Tahkwetoonah, his x mark, chief.

Omashee, (John Pokatelloaposs brother,) his x mark,
chief.

Witnesses:

Robt. Pollock, colonel Third Infantry, C. V.

M. G. Lewis, captain Third Infantry, C. V.

S. E. Jocelyn, first lieutenant Third Infantry, C. V.

Jos. A. Gebone, Indian interpreter.

John Barnard, jr., his x mark, special interpreter.

Willis H. Boothe, special interpreter.

Horace Wheat.

PALEONTOLOGICAL RESOURCE MANAGEMENT

.01 Purpose

This Manual Section provides uniform policy and direction for the Bureau of Land Management's Paleontological Resource Management Program. This Manual Section is supplemented by Paleontological Resources Handbook 8270-1. The Handbook contains detailed procedures and standards for implementing this Manual Section.

.02 Objectives

The overall objective of BLM's Paleontological Resource Management Program is to provide a consistent and comprehensive approach in all aspects relating to the management of paleontological resources including identification, evaluation, protection and use. The specific objectives of this program are to:

- A. Locate, evaluate, manage and protect, where appropriate, paleontological resources on the public lands.
- B. Facilitate the appropriate scientific, educational, and recreational uses of paleontological resources, such as research and interpretation.
- C. Ensure that proposed land uses, initiated or authorized by BLM, do not inadvertently damage or destroy important paleontological resources on public lands.
- D. Foster public awareness and appreciation of our Nation's rich paleontological heritage.

.03 Authority

BLM manages paleontological resources principally under the following authorities:

- A. Federal Land Policy and Management Act of 1976 (P.L. 94-579) requires that the public lands be managed in a manner that protects the "... quality of scientific ..." and other values. The Act also requires the public lands to be inventoried and provides that permits may be required for the use, occupancy and development of the public lands.
- B. National Environmental Policy Act of 1969 (P.L. 91-190) requires that "... important historic, cultural and natural aspects of our national heritage ..." be protected, and that "... a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences ... in planning and decision making. ..." be followed.
- C. Title 43 C FR, Subpart 8365 addresses the collection of invertebrate fossils and, by administrative extension, fossil plants.

D. Title 43 CFR, Subpart 3622 addresses the free use collection of petrified wood as a mineral material for non-commercial purposes.

E. Title 43 CFR Subpart 3621 addresses collection of petrified wood for specimens exceeding 250 pounds in weight.

F. Title 43 CFR, Subpart 3610 addresses the sale of petrified wood as a mineral material for commercial purposes.

G. Title 43 CFR, Subparts 3802 and 3809 address protection of paleontological resources from operations authorized under the mining laws.

H. Title 43 CFR, Subpart 8200 addresses procedures and practices for the management of lands that have outstanding natural history values, such as fossils, which are of scientific interest.

I. Title 43 CFR, Subpart 1610.7-2 addresses the establishment of Areas of Critical Environmental Concern for the management and protection of significant natural resources, such as paleontological localities.

J Title 43 CFR Subpart 8364 addresses the use of closure or restriction of public lands to protect resources. Such closures or restrictions may be used to protect important fossil localities.

K. Title 43 CFR Subpart 8365.1-5 addresses the willful disturbance, removal and destruction of scientific resources or natural objects and 8360.0-7 identifies the penalties for such violations.

L. Title 36 CFR, Subpart 62 addresses procedures to identify, designate and recognize National Natural Landmarks, which include fossil areas.

M. 18 USC Section 641 addresses the unauthorized collection of fossils as a type of Government property.

N. Secretarial Order 3104 grants to BLM the authority to issue paleontological resource use permits for lands under its jurisdiction.

O. Onshore Oil and Gas Order No. 1 and 43 CFR Title 3162 provide for the protection of natural resources and other environmental concerns and can be used to protect paleontological resources where appropriate.

P. Offer to Lease and Lease for Oil and Gas Form 3100-11 provides for inventories and other short term studies to protect objects of scientific interest, such as significant fossil occurrences, and requires that operations conducted under oil and gas leases minimize adverse impacts to natural and cultural resources.

Q. Federal Cave Resources Protection Act of 1988 (P.L. 100-691) and Title 43 CFR Subpart 37 address

protection of significant caves and cave resources, including paleontological resources.

.04 Responsibility

A. The Director, through the Assistant Director, Renewable Resources and Planning, and the Group Manager, Cultural Heritage, Wilderness, Special Areas and Paleontology is responsible for overall direction, leadership and coordination of BLM's paleontology program. This is accomplished through the development of program policies, strategies, procedures and directives, and in coordination with other Headquarters Groups as appropriate. This responsibility also includes coordination with other Federal agencies and Departments at the National Headquarters level.

B. State Directors, within their respective geographical jurisdictions, are responsible for the implementation of Bureau policies respecting paleontological resources, and for monitoring and evaluating the effectiveness of the paleontology program within their State.

C. Field Office Managers are responsible for the local management and oversight of paleontological resources within their geographical jurisdictions by ensuring that Bureau policies are implemented and coordinated, and that established program technical standards are met.

D. Regional Paleontologists provide professional expertise in paleontology. They serve as program coordinators for all States in their respective regions, and as the program interface between field offices and the Washington Office. In some cases, the Regional Paleontologist also serves as the State Office Paleontologist.

E. Paleontology Program Contacts are responsible for working and coordinating with BLM Regional Paleontologists to assure implementation of paleontology program policies, identification and resolution of program needs, and to carry out other day-to-day activities associated with the management of paleontological resources. BLM State Offices and Field Offices shall identify such a paleontology program contact from their staff. While the Cultural Heritage Program is responsible for the providing base funding for paleontology, such office contacts may be selected from any disciplinary background, but should be chosen for their technical background in a related discipline, e.g. geology, biology, botany, archaeology, paleontological training, availability and their personal interest in supporting the goals of the paleontology program.

F. Other BLM staff are responsible within their normal duties for helping to ensure that the Bureau's goals for the management and protection of paleontological resources are met.

.05 References

A. Departmental Manual 411 DM 1-3, Policies and Standards for Managing Museum Collections, 1997.

B. Departmental Manual 516 DM, National Environmental Policy Act of 1969.

C. 44 L.D. 325, August 6, 1915, affirmed that fossils are not minerals within the meaning of the mining laws of the United States and are not locatable under such laws.

.06 Policy

A. The paleontological resources found on the public lands are recognized by the BLM as constituting a fragile and nonrenewable scientific record of the history of life on earth, and so represent an important and critical component of America's natural heritage. BLM will exercise stewardship of these resources as a part of its public land management responsibility. In meeting this responsibility, it shall be BLM's policy to:

1. Actively work with other Federal, State and Local Government Agencies, professional organizations, private landowners, educational institutions and other interested parties to enhance and further the Bureau's and the American public's needs and objectives for paleontological resources.

2. Consider paleontological resource management a distinct BLM program, to be given full and equal consideration in all its land use planning and decision making actions.

3. Maintain a staff of professional paleontologists to provide BLM decision makers with the most current and scientifically sound paleontological resource data and advice.

4. Mitigate adverse impacts to paleontological resources as necessary.

5. Facilitate appropriate public and scientific use of and interest in paleontological resources.

6. Utilize the additional skills and resources of the Bureau's recreation and minerals programs to develop and implement interpretation strategies and products to enhance public understanding, appreciation and enjoyment of paleontological resources.

7. Vigorously pursue the protection of paleontological resources from theft, destruction and other illegal or unauthorized uses.

8. Authorize land tenure adjustments, when appropriate, as means to protect paleontological localities.

.07 File and Records Maintenance

A. Paleontological locality information is non-public information listed under Category 3 of the Bureau's Record Access Category Listing and may be withheld if the following Freedom of Information Act (FOIA) exemptions apply.

1. Exemption 2 covers records related solely to the internal practices of an agency which are of a more substantial internal matter, the disclosure of which would risk circumvention of a legal requirement.

2. Exemption 3 provides for the withholding of information prohibited from disclosure by another statute. Paleontological resources located within significant caves, for example, are thus protected by the confidentiality requirements of the Federal Cave Resources Protection Act.

3. Exemption 4 protects trade secrets and other privileged or confidential information. The release of paleontological locality information for areas where consultants or others, such as educational institutions, are permitted, for example, could severely jeopardize their work.

B. Locality data and reports associated with permits, mitigation work or other paleontology projects shall be maintained as permanent records.

.08 Relationships to other Bureau Programs

A. Resource Protection/Mitigation. All BLM programs that may have an adverse impact on paleontological resources through their actions or authorizations are responsible as benefiting activities for funding any necessary resource inventories, evaluations or other work needed to avoid or mitigate adverse impacts on paleontological resources.

B. Cultural Resources. In rare instances, paleontological resources may be found in association with cultural resources. Such occurrences fall under the provisions of the Archeological Resources Protection Act. In the event of such an occurrence, the authorized BLM Manager, in consultation with the State Office or Regional Paleontologist and the Cultural Resource Specialist will evaluate the discovery and determine an appropriate course of action that will safeguard both the paleontological and archaeological materials. The Cultural Resource Program also provides the Paleontological Resource Management Program with its linkage to the Bureau's budget system. Therefore, these program personnel are responsible for identifying and addressing funding needs for paleontology in the BLM's annual budget process.

C. Recreation. Paleontological resources have high public education and recreation values. Such values can be enhanced by publishing guides to selected collecting areas and developing interpretive trails. Working collaboratively, BLM Paleontologists and Recreation Specialists can develop responsible and outstanding recreational and educational opportunities involving paleontological resources that will enhance public understanding of fossils and the science of paleontology, and showcase BLM's stewardship role.

D. Minerals Management. Minerals management can have both positive and negative effects on paleontological resources. Mineral development, and related activities such as road building, can expose new fossil localities to scientific research or recreated in 43 CFR 3809 and 43 CFR 3162.5, as implemented and

supplemented by Onshore Oil and Gas Order No. 1, provide means, where necessary, to protect paleontological resources which may be adversely impacted by mineral development. BLM geologists can also provide valuable assistance in helping identify fossil localities, and develop interpretive and educational material related to paleontology. Fossils are not locatable under the mining laws.

E. Land Use Planning and Environmental Review. The management of paleontological resources shall be guided by and be in accordance with approved BLM land use plans.

1. Paleontological resources constitute a fragile and non-renewable scientific record of the history of life on earth. Once damaged, destroyed, or improperly collected, their scientific and educational value may be greatly reduced or lost forever. In addition to their scientific, educational and recreational values, paleontological resources can be used to inform land managers about interrelationships between the biological and geological components of ecosystems over long periods of time. It is the policy of BLM, therefore, to manage paleontological resources for these values, and to mitigate adverse impacts to them. To accomplish this goal, paleontological resources must be professionally identified and evaluated. Their values should be adequately addressed and integrated fully into the Bureau's planning system and environmental analysis documents. Generally, considerable time, money and effort may be saved by considering paleontological data as early as possible in the decision making process.

2. Paleontological Data Collection and Analysis for Planning. Locating, evaluating and classifying paleontological resources, and developing management strategies for them, must be based on the best scientific information available. Paleontological expertise is necessary to help managers and decision makers resolve issues involving paleontological resources. Because paleontological expertise is scarce within BLM, State Office or Regional Paleontologists are available and should be called upon to provide direct assistance or to identify other appropriate sources of assistance. (Detailed procedures and standards for planning for paleontological resources are contained in Handbook 8270-1 Chapter II.)

3. Mitigation. Adverse impacts to paleontological resources shall be mitigated as necessary. Any field surveys and/or inventories intended to protect paleontological resources will be targeted to specific areas or be issue driven as needed. Unless other arrangements have been made by the local manager, project proponents shall bear all costs associated with this activity. In keeping with the historical policies adopted by the Department of the Interior and the BLM, these mitigation requirements apply primarily to vertebrate fossils. However, where noteworthy occurrences of invertebrate or plant fossils are known or

expected, the same planning and mitigation policies and procedures shall be followed. (See 8270-1 Handbook Chapter III for mitigation standards and procedures.)

.09 Paleontological Resource Use

The desired outcome of managing paleontological resources is to ensure their availability for scientific, educational and recreational uses. Such uses include collection, site interpretation, study and exhibition. Collection may or may not require a permit (See B. below). In cases where permits are required, the permitting process fulfills several important functions. Permits provide for the proactive management of paleontological resources by alerting managers to the presence of noteworthy occurrences of paleontological resources, their condition and vulnerability. When needed, permits facilitate research by qualified paleontologists and serve as a bridge for communication between land managers and researchers. The permitting process provides appropriate protection to other resources that may be impacted by permitted collecting activities, and provides a consistent administrative structure for BLM's management effort. An efficient and uniform permitting process is also essential to and consistent with BLM's customer-oriented focus.

A. A Paleontological Resource Use Permit is a land use authorization issued to a qualified applicant for the purpose of carrying out various paleontological activities, such as identification, survey, collection or excavation, on lands managed by BLM. Such permits are nonexclusive, noncompetitive, minimum impact permits, and are not subject to Notice of Realty Action, filing fees or cost reimbursement. State Offices are responsible for processing and issuing such permits in consultation with the appropriate Field Office and Regional Paleontologist.

B. Determining the need for a Paleontological Resource Use Permit

1. Invertebrate Fossils, Plant Fossils and Petrified Wood. In accordance with existing regulations, the public lands, except where otherwise posted or prohibited, are open for the collection of invertebrates, plant fossils and petrified wood. (See Section .03, Authority) Permits are not normally required for such collection. (See 8270-1 Handbook for collecting standards.) However, in some situations, localities containing noteworthy occurrences of such fossils may be closed to collection except under permit. Such closures shall be established through the land use planning process, and shall be carried out in consultation with the BLM Regional Paleontologist.

2. Vertebrate Fossils. Unregulated collection of vertebrate fossils is not allowed in 43 CFR 8365.1-5. Therefore, permits are required for the collection of vertebrate fossils, including their trace fossils, such as trackways and coprolites. Refer to 8270-1 Handbook for permit procedures.

C. BLM issues two types of Paleontological Resource Use Permits.

1. Survey and Limited Surface Collection Permits are issued to expedite broad ranging survey/reconnaissance work in order to identify vertebrate fossil localities for scientific research, inventory or planning purposes, or in advance of projects which may threaten such localities. Collection of material for carrying out locality (site) investigations and evaluation/characterization studies, and where the use of such small sites as temporary field work stations will be restored to their natural condition within the same work season, is allowed, providing that such activities can ordinarily be expected to result in only negligible surface disturbance, i.e., less than 1 square meter, and can be done with hand tools. Such non-destructive paleontological data collection, inventory, research or monitoring activities are generally deemed to meet the provisions of Chapters 2 and 6, Appendices 1 and 5 respectively, of Departmental MS 516, Categorical Exclusions.

2. Excavation Permits are issued for the collection of vertebrate fossils where surface disturbance exceeds the limits permissible for the survey and limited surface collection work stated in C.1 above.

D. Permit Administration. Permittee qualifications and other matters relating to the administration of Paleontological Resource Use Permits may be found in the 8270-1 Handbook Chapter IV.

E. Commercial Collection. BLM does not authorize the commercial use of fossils collected on public lands. Petrified Wood may be purchased as a mineral material under procedures described in 43 CFR Subpart 3610.

F. Paleontological Resources in Special Areas.

1. Wilderness and Wilderness Study Areas. Paleontological resources may be found in designated Wilderness or Wilderness Study Areas. Scientific research involving collection and removal of paleontological resources is not considered incompatible with the concept of wilderness preservation as provided for in Section 4(b) of the 1964 Wilderness Act. Additionally, paleontological resources are considered to be supplemental values, as provided for in Section 2(c) of the Act. The following provisions are recommended for addressing the management of paleontological resources in such areas:

a. The BLM will permit on a case-by-case basis the survey and limited surface collection of fossils by qualified paleontologists, where such resources have important scientific value. Such activities must be carried out in a manner that would not degrade the wilderness character.

b. The use of motorized transportation or mechanized equipment in a wilderness area is prohibited except when approved as the minimum tool necessary to

accomplish the work. Such use must be approved by the State Director.

c. Salvage, excavation and collection of fossils may be done only on a case-by-case basis where the project will not degrade the overall wilderness character of the area and where such activity is needed to preserve paleontological resources.

2. Other Special Management Areas. A variety of Special Area designations may be available to enhance the management and/or protection of paleontological resources. Such designations include Research Natural Areas, National Natural Landmarks and Areas of Critical Environmental Concern. Such areas are established through the land use planning process and shall be done in consultation with the BLM Regional Paleontologists.

G. Collection Management. Fossils collected under a Paleontological Resources Use Permit remain the property of the Federal Government and shall be curated in an approved repository in conformance with the provisions of Departmental Manual 411. BLM managers shall select repositories which can

appropriately maintain such collections from public lands and their associated records, and make this information available to BLM upon request. Repositories should be encouraged, if they have not already done so, to establish and maintain electronic databases of specimen, locality and other associated data.

H. Split Estate Lands. Split estate lands are those lands where title to the surface and mineral estate have been severed. Title to the different estates are often held by different parties. In many instances where the surface estate is not owned by the Federal Government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of the surface estate. If BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. In most States the owner may elect to waive these recommendations. Such a waiver shall be documented in the case file.

APPENDIX K – LANDS AND REALTY

Section 102(a)(1) of the Federal Land Policy Management Act (FLPMA) provides that Congress declares that it is the policy of the United States that... “the public lands be retained in Federal ownership, unless as a result of the land use planning procedure provided for in this Act, it is determined that disposal of a particular parcel will serve the national interest;...”

GENERAL INFORMATION PERTAINING TO LAND OWNERSHIP ADJUSTMENTS

Land Exchanges

This type of real estate transaction is typically processed under the authority of the FLPMA and involves the discretionary, voluntary exchange of lands or interests in lands between the Federal government and a non-Federal party. It is required that:

- Sec. 206(b) - the Federal and non-Federal lands involved be located in the same state
- Sec. 206(b) - the Federal and non-Federal lands be of equal value, or in certain circumstances, approximately equal in value
- Sec. 206(a) - exchanges be completed only after a finding that the public interest would be well served

In considering whether an exchange is in the public interest, consideration is given to the opportunity to:

- Sec. 206(a) - achieve better management of Federal lands
- Sec. 206(a) - meet the needs of state and local residents and their economies
- Sec. 206(a) - secure important objectives, including but not limited to, protection of fish and wildlife habitats, cultural resources, watersheds, wilderness and aesthetic values; enhancement of recreation opportunities and public access; consolidation of lands and/or interests in lands; consolidation of split estate; expansion of communities; accommodation of land use authorizations; promotion of multiple-use values; and fulfillment of public needs

In making the public interest determination, there needs to be a finding that:

- the resource values and the public objectives that the Federal lands or interests to be conveyed may serve if retained in Federal ownership are not more than the resource values of the non-Federal lands or interests and the public objectives they could serve if acquired, and
- the intended use of the conveyed Federal lands will not significantly conflict with established

management objectives on adjacent Federal lands and Indian trust lands

Land Exchanges vs. Other Methods of Disposal/Acquisition

To help assure the integrity of state and local tax bases, land exchange would be the first priority for both acquisition of non-Federal land and the conveyance of Federal lands into non-Federal ownership of those parcels identified for disposal, except under the following circumstances: 1) where there is a competitive market situation and multiple entities are interested in a parcel of land, land sale may be considered, or 2) where one of the following situations apply, a disposal method other than exchange may be considered: a) resolving inadvertent unauthorized use or occupancy b) providing for community expansion and development c) meeting obligations completing state selections, and d) creating facilities or service for public health, safety and welfare.

Sales

Sales of public lands are authorized under section 203 of FLPMA and offered at not less than fair market value. Public lands determined suitable for sale are offered only on the initiative of the BLM. Such sales have to meet at least one of the following FLPMA sales criteria:

- Sec. 203(a)(1) – such tract because of its location or other characteristics is difficult and uneconomic to manage as part of the public lands, and is not suitable for management by another Federal department or agency; or
- Sec. 203(a)(2) – such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose; or
- Sec. 203(a)(3) – disposal of such tract will serve important public objectives, including but not limited to, expansion of communities and economic development, which cannot be achieved prudently or feasibly on land other than public land and which outweigh other public objectives and values, including, but not limited to, recreation and scenic values, which would be served by maintaining such tract in Federal ownership.

The preferred method of sale of public lands is by competitive bidding at public auction. However, modified competitive bidding may be used to protect ongoing uses, to assure compatibility of the possible uses with adjacent lands, or to avoid dislocation of existing users. Direct sale may be used when the public lands offered for sale are completely surrounded by lands in one ownership with no public access, or where the lands are needed by state or local governments or non-profit

corporations, or where necessary to protect existing equities in the lands or resolve inadvertent unauthorized use or occupancy.

Conveyance of Federally-Owned Mineral Interests – Section 209(b), FLPMA

Section 209(b) of FLPMA provides for the conveyance of mineral interests owned by the United States where the surface is or will be in non-Federal ownership. There must be a finding that: 1) there are no known mineral values in the land, or 2) that the reservation of the mineral rights in the United States is interfering with or precluding appropriate non-mineral development of the land and that such development is a more beneficial use of the land than mineral development.

Such conveyance of mineral interests can only be made to the existing or proposed record owner of the surface upon payment of administrative costs and the fair market value of the interests being conveyed.

Direct Purchases

Direct purchases of lands or interest in lands would be limited to cases where no practical alternatives exist, high public values would be obtained, and purchase funds are appropriated. Such actions would need to meet the acquisition criteria for the particular alternative being considered.

Methods of Acquisition

Acquisition of lands or interests in lands would be by methods such as exchange, purchase, donation, or public agency jurisdictional transfer.

Methods of Disposal

Disposal methods to implement land ownership adjustment actions would not vary by alternative, and generally would include the following: a) exchanges b) sales c) Recreation and Public Purposes Act conveyances d) airport grants e) public agency jurisdictional transfers f) state grants

Mineral patents are not considered a land ownership adjustment for the purposes of this plan.

LAND OWNERSHIP ADJUSTMENT CRITERIA

Three types of land ownership adjustment criteria will be adopted (retention, disposal, and acquisition) to provide guidance in categorizing BLM administered land, and in making decisions concerning specific actions.

General Criteria

1. Requirements of applicable laws, executive orders, and regulations will be followed.
2. Priority will be determined by the area directly impacted and the significance of the resources in descending order of National, regional, statewide, and

local. Both economic and non-economic values will be considered in assessing resource significance.

3. A critical level of significance will be assigned to resource values if they are adversely impacted over an area larger than the specific tract being considered for any land ownership adjustment action.

4. Public value losses which cannot be mitigated will be assigned a higher level of significance than those which can be mitigated.

5. A higher level of significance will be assigned to public values which are associated with solving chronic management problems.

RETENTION CRITERIA

These are land tracts which will likely remain as BLM administered land. Although the underlying philosophy is long-term public ownership, adjustments in retention areas involving exchanges and/or sales may occur when the public interest is served.

1. Areas containing moderate to high resource values and/or characteristics. These include but are not limited to:

- Land along rivers, streams, lakes, dams, ponds, springs, and trails
- Riparian areas, community watersheds and/or flood plains
- Areas that contain T&E species of wildlife or aquatic or vegetation
- Areas with special status wildlife species, or aquatic species or vegetative species
- Important general wildlife habitat areas
- Recreation sites and areas
- Significant cultural resource sites
- Geologic areas containing unique or rare features or formations
- Areas with important or unique forest/woodland values
- Other areas containing moderate to high resource values and/or characteristics

2. Lands with a combination of moderate to high multiple-use values which dictate retention in public ownership.

3. Areas of National environmental significance: These include but are not limited to:

- Wilderness, Wilderness Study Areas and former WSAs being studied for protective management
- Wild & Scenic Rivers
- National Scenic & Historic Trails and Study Trails

- Lands containing nationally significant cultural resource sites nominated to or eligible for the National Register of Historic Places
- National Conservation areas
- Wetlands and Riparian Areas under Executive Order 11990
- Other Congressionally Designated Areas and Study Areas
- Areas of Critical Environmental Concern

4. Areas of National economic significance. These include but are not limited to:

- Designated Mineral Resource Areas where disposal of the surface would unnecessarily interfere with the logical development of the mineral estate, e.g., surface minerals, coal, phosphate, known geologic structures, etc.
- Lands containing strategic minerals needed for National defense.

5. Lands used in support of National defense: These include but are not limited to U.S. Military and National Guard maneuver areas.

6. Areas where future plans will lead to further consolidation and improvement of land patterns and management efficiency.

7. Areas which the general public, state and local government consider suitable for public ownership.

8. Lands withdrawn by the BLM or other Federal agencies for which the purpose of the withdrawal remains valid and the resource uses can be managed concurrently by BLM.

9. Lands that contribute significantly to the stability of the local economy by virtue of Federal ownership.

10. Lands which provide public access and contain previously mentioned public values which, when considered together, warrant their retention.

11. Guidelines for the retention of the mineral estate are fairly well described and are mandated under FLPMA. These require that the mineral estate be reserved by the U.S. in all land disposals except in some cases where exchanges are involved. In exchanges, the mineral estate may be reserved by both parties presuming there will be no material interference with development of the mineral resource due to disposal of the surface estate. If values are equal, mineral estate title may pass with the surface estate.

ACQUISITION CRITERIA

The following criteria will be used to evaluate proposals which would result in the acquisition of non-Federal lands and/or interest in lands through exchange, fee purchase, donation or other transactions. Priority will be

determined on the basis of multiple-use analysis. The greater the number of resource programs and public values served, the higher the priority for acquisition. All proposals will be evaluated to determine if the non-Federal lands meet any of the following specific criteria:

1. Contain moderate to high resource values and/or characteristics.

- Land along rivers, streams, lakes, dams, ponds, springs, and trails
- Riparian areas, community watersheds and/or flood plains
- Areas that contain T&E species of wildlife or aquatic or vegetation
- Areas with special status wildlife species, or aquatic species or vegetative species
- Important general wildlife habitat areas
- Recreation sites and areas
- Significant cultural resource sites
- Geologic areas containing unique and/or scarce features
- Areas with important or unique forest/woodland values
- Other areas containing moderate to high resource values and/or characteristics

2. Have the potential for enhancement, manageability or investment opportunity of existing BLM administered lands.

3. Facilitate access to BLM administered land retained for long-term public use.

4. Enhance congressionally designated areas, rivers, or trails.

5. Primarily focused in the "retention" areas. (Acquisition outside of retention areas may be considered if the action leads to and/or facilitates long-term needs or program objectives).

6. Facilitate National, state and local BLM priorities or mission statement needs.

7. Will enhance existing or future activity plans on BLM administered land.

8. Stabilize or enhance local economies or values.

9. Meet long-term BLM land management goals as opposed to short-term BLM land management goals.

10. Are of sufficient size to improve use of adjoining BLM administered land or, if isolated, large enough to allow for the identified potential public land use.

11. Allow for more diverse use, more intensive use, or a change in uses to better fulfill the Bureau's mission.

12. Enhance the opportunity for new or emerging BLM administered land uses or values.

13. Contribute to a wide spectrum of uses or large number of public land users.

14. Secure for the public significant water related land interests. These interests will include lake shore, dam shore, river front, stream, and pond or spring sites.

15. Consolidate mineral estates with surface estates to improve potential for development while improving resource management and economic values of existing BLM administered lands.

Avoid the following when considering acquisition proposals:

Acquiring lands or interests in lands that present management problems that outweigh the expected benefits of such an acquisition, including but not limited to:

- presence of hazardous materials
- abundance of noxious weeds
- access situation is inadequate for managing the property for the purpose(s) for which it would be obtained, etc.
- acquisition of small, isolated tracts

ACCESS CRITERIA

The BLM shall endeavor to maintain existing access, provide future access, and manage access to BLM administered lands in coordination with other Federal agencies, state and local governments, and private landowners.

Specific Access Criteria

1. Obtain access to BLM administered lands in retention areas. (Acquisition of access outside of retention areas may be considered if the action leads to and/or facilitates long term needs or program objectives).
2. Protect, maintain, and manage existing access to BLM administered lands.
3. Manage access to BLM administered lands within BLM's multiple-use mandate.
4. Acquire access on the basis of the following considerations:
 - Where there are moderate to high resource values on existing BLM administered land.
 - Where there is public demand which is closely tied to resource values.
 - Access to larger blocks or parcels of BLM administered land have priority. The presence of important resource values may justify acquiring access to smaller tracts.

- For those projects on BLM administered lands in which substantial public monies have been spent, and in which continuing diverse public use is expected, permanent exclusive access for the general public should be obtained. For lesser investment projects and/or those to which general public use will need to be limited, nonexclusive easements should be obtained.
- Although the Bureau is not required to provide access to mineral resources, the acquisition of such access could be useful in controlling the construction of multiple and unnecessary access routes within the same general area.

DISPOSAL CRITERIA

These are lands identified for potential removal from BLM administration through transfer to other Federal agencies, or by exchange, sale or R&PP Patent to state, county or local public entities, or by exchange or sale to private entities, private groups, private organizations or individuals. Disposal decisions will be made in the public interest based upon the following criteria:

1. Lands with high public values proper for management by other Federal agencies, or state or local governments.
2. Small parcels of BLM administered land contiguous to National Forest land may be considered for transfer to the U.S. Forest Service through a Public Land Order. Other BLM administered land may be considered for transfer where appropriate.
3. Small parcels of BLM administered lands contiguous to State land may be considered for transfer to the State of Montana. Other BLM administered land may be considered for transfer where appropriate.
4. Lands of limited public value.
5. Widely scattered parcels which are difficult and uneconomical to manage with anything beyond minimal custodial administration and have no significant public values.
6. Lands which will serve important public objectives (such as community expansion) as provided in FLPMA.
7. Lands where disposal would aid in aggregating or repositioning other BLM administered lands or land resource values in retention areas to facilitate National, state and local objectives.
8. Lands acquired for a specific Federal purpose which are no longer required for that or any other Federal purpose.
9. Lands with general unauthorized use problems, if the lands are not required for public purposes.
10. Lands with unauthorized occupancy use where permanent structures are involved.

Potential Disposal Parcels

The following lands, totaling 6,818 acres, are potentially suitable for disposal through sale under section 203(a) of FLPMA if important recreation, wildlife, watershed, threatened or endangered species habitat, and/or cultural

values are not identified during disposal clearance reviews and no viable exchange proposals for them can be identified. These lands would also be available for transfer to another agency or to local governments, as needed, to accommodate community expansion and other public purposes.

Potential Disposal Parcels			
Legal Description			Acreage
T. 1 N., R. 6 W.	Section 10	SW $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
	Section 11	SW $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
	Section 12	NW $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
	Section 29	SE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
		NE $\frac{1}{4}$ SE $\frac{1}{4}$	40.00
T. 1 N., R. 14 W.	Section 10	Lot 3	43.89
	Section 28	NW $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
T. 2 N., R. 1 W.	Section 2	Lot 3	37.91
		Lot 4	37.81
		S $\frac{1}{2}$ NW $\frac{1}{4}$	80.00
	Section 6	Lot 1	40.70
		Lot 2	40.50
		Lot 3	40.30
		Lot 4	31.76
		Lot 5	32.32
		Lot 6	32.32
		Lot 7	33.59
		SE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
	Section 34	SE $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
		S $\frac{1}{2}$ SE $\frac{1}{4}$	80.00
T. 3 N., R. 1 W.	Section 32	N $\frac{1}{2}$	320.00
T. 6 N., R. 4 W.	Section 3	Segregated Survey	41.02
	Section 5	Lot 12	38.54
		Lot 23	2.70
	Section 8	Lot 3	30.56
		Lot 14	0.47
T. 7 N., R. 3 W.	Section 4	Lot 8	48.47
T. 7 N., R. 4 W.	Section 24	SE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
		NE $\frac{1}{4}$ SE $\frac{1}{4}$	40.00
	Section 35	Segregated Survey	8.5 est.

Potential Disposal Parcels			
Legal Description			Acreage
T. 8 N., R. 3 W.	Section 9	Lot 6	2.27
		SE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
	Section 10	Lot 1	38.93
		Lot 6	1.79
		Lot 7	31.87
		Lot 10	29.34
		Lot 11	0.26
		Lot 16	19.74
	Section 15	NE $\frac{1}{4}$ NW $\frac{1}{4}$	40.00
	Section 29	SE $\frac{1}{4}$ SE $\frac{1}{4}$	40.00
	Section 32	NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$	10.00
T. 8 N., R. 4 W.	Section 12	Metes & Bounds	5.00 est.
	Section 13	NW $\frac{1}{4}$ NW $\frac{1}{4}$	40.00
		Lot 1	39.39
	Section 14	Lot 20	4.58
		Lot 21	4.15
		Lot 22	2.71
	Section 23	Lot 15	5.87
		Lot 16	0.93
		Lot 17	6.94
		Lot 18	0.85
T. 9 N., R. 2 W.	Section 20	Lot 7	2.36
		Lot 9	28.04
	Section 21	Lot 2	31.33
		Lot 6	20.27
		Lot 7	0.22
		Lot 8	0.90
		Lot 9	0.90
		Lot 10	0.45
		Lot 5	0.12
	Section 22	Lot 6	19.46
T. 9 N., R. 3 W.	Section 32	Lot 14	1.43
T. 10 N., R. 1 W.	Section 6	metes and bounds	.640
		metes and bounds	.06
		metes and bounds	.57
	Section 32	SE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00

Potential Disposal Parcels			
Legal Description			Acreage
T. 10 N., R. 4 W.	Section 36	Lot 41 (metes and bounds)	.023
T. 10 N., R. 5 W.	Section 3	Lot 22	18.09
		Lot 28	20.24
	Section 4	Lot 14	34.93
		Lot 18	40.41
T. 11 N., R. 4 W.	Section 36	Lot 2	20.31
		Lot 4	8.26
		Lot 6	.82
		Lot 7	6.27
T. 11 N., R. 5 W.	Section 15	Lot 3	17.73
	Section 16	Lot 5	44.09
	Section 27	Lot 4	43.69
	Section 34	Lot 8	35.21
		Lot 9	28.32
T. 12 N., R. 6 W.	Section 36	Lot 35 (metes and bounds)	.10
T. 14 N., R. 3 W.	Section 4	Lot 6 (metes and bounds)	3.89
T. 1 N., R. 2 E.	Section 14	W $\frac{1}{2}$ W $\frac{1}{2}$	160.00
T. 2 N., R. 2 E.	Section 12	N $\frac{1}{2}$	320.00
T. 3 N., R. 1 E.	Section 12	NW $\frac{1}{4}$	160.00
T. 3 N., R. 7 E.	Section 30	E $\frac{1}{2}$ NE $\frac{1}{4}$	80.00
T. 4 N., R. 2 E.	Section 34	SW $\frac{1}{4}$	160.00
T. 4 N., R. 3 E.	Section 26	SW $\frac{1}{4}$ SE $\frac{1}{4}$	40.00
T. 4 N., R. 6 E.	Section 6	Lot 3	21.20
		Lot 4	15.76
T. 5 N., R. 5 E.	Section 26	NW $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
	Section 34	N $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$	20.00
		N $\frac{1}{2}$ S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$	10.00
		N $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$	20.00
		N $\frac{1}{2}$ S $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$	10.00
		E $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$	5.00
		W $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$	5.00
		NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$	2.50
		NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$	2.50
		N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$	20.00
		N $\frac{1}{2}$ S $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$	10.00
		S $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$	20.00

Potential Disposal Parcels			
Legal Description			Acreage
		SW $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
T. 6 N., R. 3 E.	Section 20	W $\frac{1}{2}$ SW $\frac{1}{4}$	80.00
T. 8 N., R. 1 E.	Section 8	NE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
	Section 18	NW $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
		NE $\frac{1}{4}$ NW $\frac{1}{4}$	40.00
		E $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$	20.00
T. 1 S., R. 1 W.	Section 4	W $\frac{1}{2}$ SE $\frac{1}{4}$	80.00
T. 1 S., R. 6 W.	Section 4	SW $\frac{1}{4}$ NW $\frac{1}{4}$	40.00
	Section 12	N $\frac{1}{2}$ NE $\frac{1}{4}$	80.00
		NW $\frac{1}{4}$	160.00
		W $\frac{1}{2}$ SW $\frac{1}{4}$	80.00
		SE $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
		NE $\frac{1}{4}$ SE $\frac{1}{4}$	40.00
		S $\frac{1}{2}$ SE $\frac{1}{4}$	80.00
	Section 14	All	640.00
T. 2 S., R. 9 W.	Section 24	NE $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
T. 2 S., R. 9 E.	Section 24	SE $\frac{1}{4}$ SE $\frac{1}{4}$	40.00
T. 1 S., R. 1 E.	Section 14	NW $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
T. 2 S., R. 2 E.	Section 3	NE $\frac{1}{4}$ SW $\frac{1}{4}$	40.00
T. 2 S., R. 10 E.	Section 2	SW $\frac{1}{4}$ NW $\frac{1}{4}$	40.00
	Section 3	SW $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
		SE $\frac{1}{4}$	160.00
	Section 10	NE $\frac{1}{4}$	160.00
		NE $\frac{1}{4}$ NW $\frac{1}{4}$	40.00
	Section 17	NE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
		S $\frac{1}{2}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$	20.00
		SE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
		S $\frac{1}{2}$ S $\frac{1}{2}$ NW $\frac{1}{4}$	40.00
		S $\frac{1}{2}$	320.00
	Section 20	N $\frac{1}{2}$ N $\frac{1}{2}$	160.00
T. 2 S., R. 12 E.	Section 27	NE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
T. 3 S., R. 12 E.	Section 9	W $\frac{1}{2}$ NW $\frac{1}{4}$	80.00
T. 4 S., R. 8 E.	Section 14	NE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00
		S $\frac{1}{2}$ NE $\frac{1}{4}$	80.00
		SE $\frac{1}{4}$	160.00
T. 4 S., R. 9 E.	Section 20	NW $\frac{1}{4}$ SE $\frac{1}{4}$	40.00

Potential Disposal Parcels			
Legal Description			Acreage
		S½SE¼	80.00
	Section 30	SW¼	160.00
	Section 32	NW¼SW¼	40.00
T. 6 S., R. 8 E.	Section 9	S½, SE¼SE ¼, Tract 37	.70

APPENDIX L – FLUID MINERALS APPENDIX

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FLUID MINERALS

OIL AND GAS REASONABLY FORESEEABLE DEVELOPMENT (RFD)

INTRODUCTION

At the time the 1984 Headwaters RMP was prepared little additional leasing was anticipated to take place because most available leases had already been acquired under existing established leasing regulations with appropriate stipulations for special conditions. It was also anticipated that a relatively large number of permits to drill might be sought, given the accelerated level of exploration activity that was being driven by economic conditions at the time and relatively new discovery of prospects for deep structurally trapped oil in the Montana Overthrust Belt. Laws, regulations, and rules were in-place to provide guidance with these leasing and permitting activities. It was anticipated that oil and gas drilling would be a part of the foreseeable future of resource development within the Planning Area.

Despite the flurry of exploration activity in the Montana Overthrust Belt in 1983, the only two areas of oil and gas production were in Teton and Ponderosa counties, east of the Rocky Mountain Front in areas that have since been removed from the Planning Area.

The Reasonably Foreseeable Development scenario is an estimate of oil and gas activity expected because of resumed oil and gas leasing in the Planning Area. The scenario is hypothetical in that drilling may occur anywhere in the planning area where an oil and gas lease allowing surface occupancy is issued. Actual drilling proposals that result from leasing, if any, will likely differ in location from those anticipated by this RFD scenario. It is also possible that leasing could result in either more or fewer drilling proposals than presented in the scenario.

The RFD scenario attempts to portray the most reasonable and likely number of wells expected from a leasing decision on the Butte Field Office Planning Area. It is derived from knowledge of the USGS plays, Energy Information Administration price forecasts, oil and gas occurrence and development potential classifications for the Planning Area, and historical activity.

Development potential is a ranking system, which is created so planners can evaluate the potential cumulative impacts of an oil and gas leasing decision on a designated area. BLM petroleum geologists rank the development potential of the planning area based on the probability, at this point in time, of oil and gas drilling occurring in the future. It is important to understand that development potential is a dynamic

ranking system, which changes with time as new data and ideas become available. The development potential can also change as a function of the economics of oil supply and demand.

OCCURRENCE AND DEVELOPMENT POTENTIAL

Occurrence and Development Potential Rankings

BLM staff geologists have classified the potential for occurrence and development of oil and gas resources within the Butte Field Office Planning Area. Their analysis is based on bedrock geologic mapping, geophysical data, and 110 oil and gas wells drilled in Planning Area. A summary of the geology, for each of the 1:100,000 quadrangles used for discussion and development of the occurrence and development potential sections of this report can be found in unpublished reports by Long (1990a-h, 1991a-c) that are on file in the BLM Montana State Office. The potential for oil and gas resource development within the Planning Area is shown on **Figure A-1**.

On **Figure A-1**, areas have been designated as having moderate, low, and very low potential for the occurrence and development of oil and gas resources. As with the occurrence potential, there are no areas of "high" development potential within the Butte Field Office Planning Area. High development potential areas occur only within proven producing petroleum provinces or in areas with a significant number of hydrocarbon "shows". Areas of moderate development potential have a significant thickness of sedimentary section present that includes possible source and reservoir rocks. An area having a low potential for development has a thin sedimentary section present or there is insufficient subsurface data available to analyze the potential. It also lacks source or reservoir rocks or is metamorphosed. An area of very low development potential has no sedimentary section at the surface or insufficient data for a different classification. These areas also include areas of Federal lands that are unavailable for leasing. The principal source of information used to determine the development potential of the Butte Field Office Planning Area is a series of 1:100,000 quadrangles (Long, 1990a-h, 1991a-c).

Development potential is not a prediction of precise future drilling locations and should not be used as a gauge of future interest or lack of interest in leasing. Oil and gas companies have numerous sources of proprietary data not available to the BLM (such as seismic data or internal geologic reports), which they use prior to making financial commitments to lease or

drill. Therefore, even though an area is rated as very low development potential at this time with a low probability for any wells being drilled, a company may still be interested in leasing that area, should it be made available.

Drilling Activity Forecast

In order for the BLM to be able to analyze the effects of renewed oil and gas leasing, and possible impacts related to exploration, development, and cumulative effects, it is necessary to estimate how many wells industry might drill in the next 20 years. The following RFD scenario has been developed using historical oil and gas development, and oil "play" information from the USGS, potential development maps and other data from BLM files, and a number of other technical sources.

The BLM has mapped the potential for occurrence of oil and gas under the Butte Field Office Planning Area and the potential for industry to develop those possible resources. The classification of development potential is depicted on **Figure A-1**. From these maps and other information, including leasing history and past and present economics, a forecast of the number of wells that might be drilled in the Planning Area on lands of all mineral ownerships is made.

Based on this analysis, an estimate was made that as many as fifteen (15) conventional oil and gas wildcat wells (exploratory wells drilled in an area with no existing production) might be drilled in the Butte Field Office Planning Area in the next 15 to 20 years (**Table 1**). Of these fifteen (15) wells, it is estimated that eleven (11) would be "dry" holes (no economically producible oil or gas is discovered). Dry holes would be plugged and abandoned with surface reclamation occurring shortly afterward. It is further estimated that four (4) of the wells could have oil or gas discoveries, two (2) of which would become producers with one located on either BLM minerals or lands administered by the Forest Service, and the other located on privately owned mineral lands. Each of the discovery wells would probably prompt additional step-out wells. A "step-out well" is a well drilled adjacent to or near a proven well to establish the limits and continuity of the oil or gas reservoir and/or to assist with production. It was estimated that a total of eight (8) step-out wells would be drilled, two for each discovery.

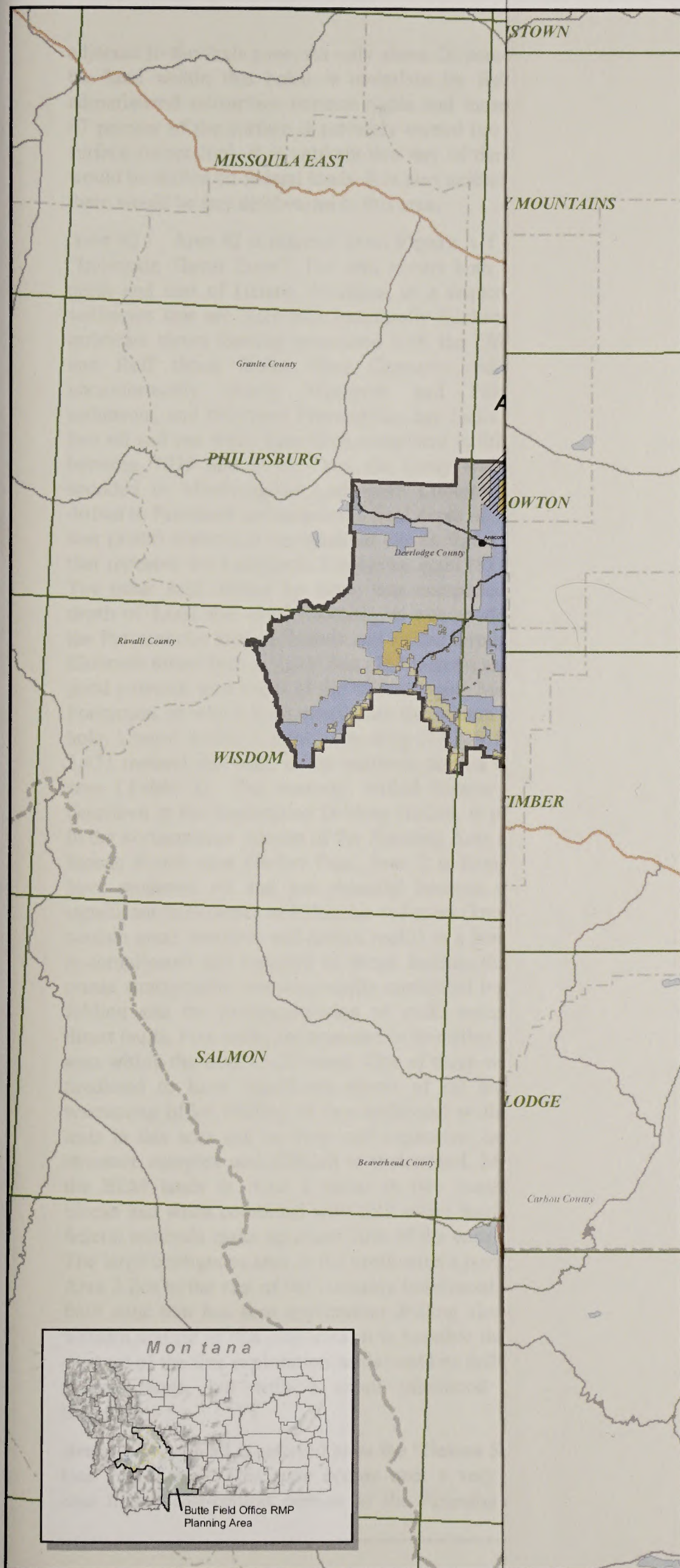
In addition to conventional oil and gas wells, it is anticipated that as many as 40 wells (**Table 1**) would be drilled for coal bed natural gas in limited and scattered areas of known sub-bituminous coal resources located Gallatin and Park Counties; most likely in the Trail Creek Road area near Bozeman Pass (Livingston and Trail Creek Fields).

The first four general geographic areas within the Butte Field Office Planning Area, where conventional oil and gas exploration is predicted to occur are shown on

Figure A-1. Each of the four areas is associated with one or more play areas described above in the section entitled USGS Hydrocarbon Provinces and Plays. It is anticipated that the 15 projected wildcat wells would be drilled somewhere within the boundaries of these four play areas. (**Table 1**)

Table 1 Drilling Activity Forecast (RFD) Mineral Assessment Report				
Area	Wildcat Wells	Discoveries	Step-out Wells	Commodity
Area 1	2	0	0	
Area 2	5	1	2	Gas
Area 3	4	1	2	Gas
Area 4	4	1 deep	2	Gas
		1 shallow	2	Oil
Area 5	10	6	24	coal bed natural gas
TOTAL	25		32	

Area # 1 - Area #1 is referred to on **Figure A-1** as the "Southern Deerlodge Valley Basin Area". This area occurs in the southernmost portion of a fault bounded Tertiary-aged basin that is located in the Deerlodge Valley. Along the eastern edge of this basin volcanic rocks obscure a thin section of Tertiary age basin fill sediments that in turn overlie Boulder Batholith rocks (Long, 1990b). Further to the west within this basin, rocks of Miocene to Eocene age have been encountered in previous drilling. The rocks are all non-marine and consist of sands and gravels of alluvial channels interlayered with sand, silt, and clay-rich alluvial overbank deposits that are interspersed with fine-grained sediments deposited in lakes and marshes. These sediments have accumulated in thickness as great as 10,000 feet (3,048 meters). Fluvial sandstones are thought to be potential reservoir rocks with the source of oil and gas being either organic material buried deeply in the Tertiary basin proper or having migrated from Paleozoic sediments that lie beneath the Tertiary basin fill or across the basin margin faults. The thickest and most complete section of Paleozoic rocks lies to the west of the holes shown in the area of moderate potential (**Figure A-1**). Two holes have been drilled within the Planning Area and five more have been drilled in a similar geologic setting immediately to the north of this area. These holes were drilled from 6,411 feet (1,954 meters) to as much as 11,774 feet (3,589 meters) deep (Long, 1990b). One well, the Amoco 1 Johnson, encountered good oil shows in the Tertiary basin fill sediments. Two exploratory wells for oil and gas might be expected in the next 15-20 years in this portion of the Planning Area. They would probably lie to the north and west of the holes shown, closer to basin margin faults with potentially thicker sequences of Paleozoic source rocks underlying Tertiary basin fill



Occurrence Potential

- Moderate
- Low
- Very low

- MBOGC Oil and Gas Wells
- Currently Drilling Well
- Livingston and Trail Creek Coal Fields
- Minor Coal Fields

Development Potential

- Area of Reasonably Forseeable Development and Drilling Activity

- BFO Boundary
- 1:100,000 Map Boundaries
- Bureau of Land Management (BLM) Land



0 Miles 20



No warranty is made by the Bureau of Land Management (BLM) for use of data for purposes not intended by BLM.

FIGURE A-1

Oil and Gas Occurrence and
Development Potential
Mineral Assessment Report
BLM, Butte Field Office
Butte RMP and EIS

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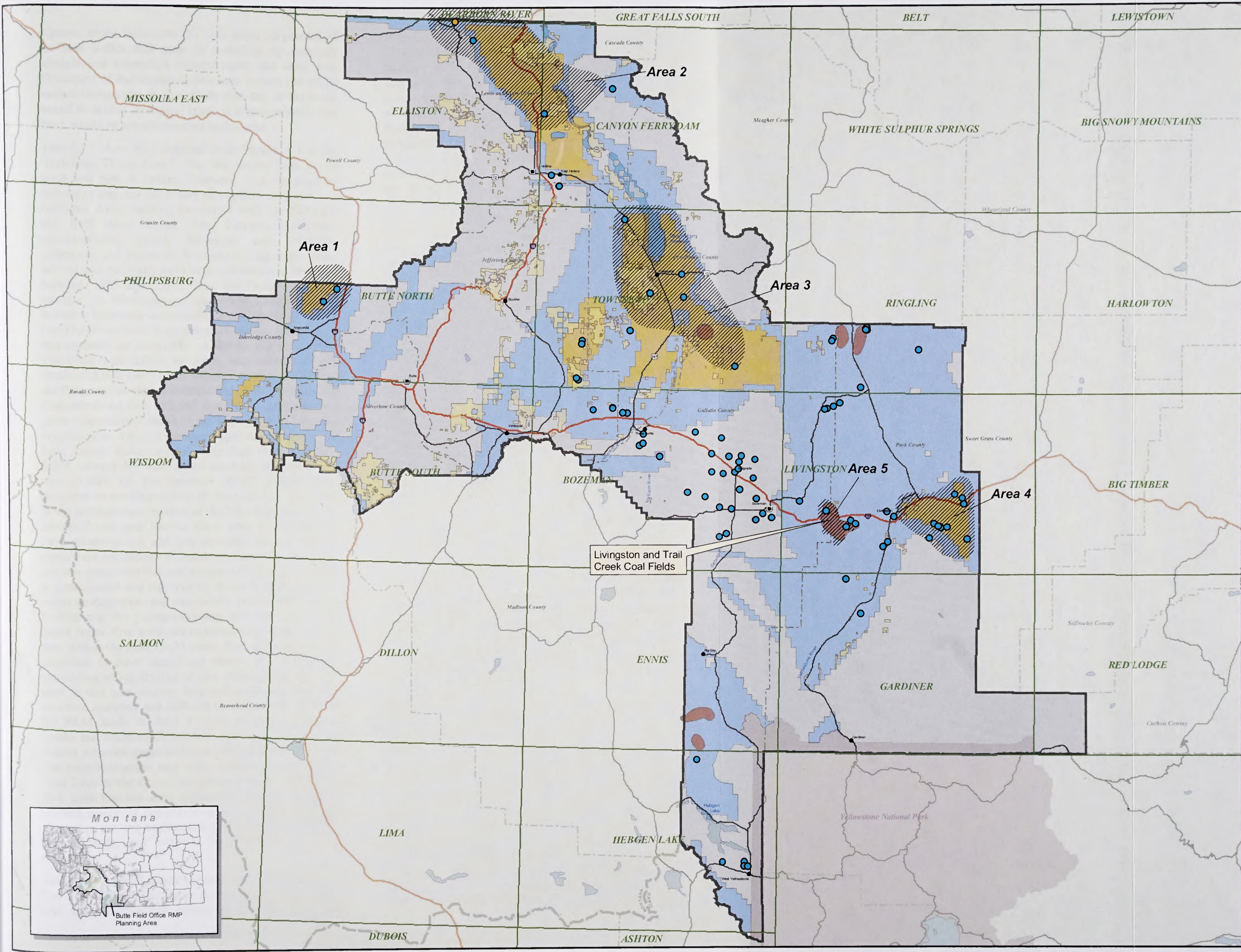
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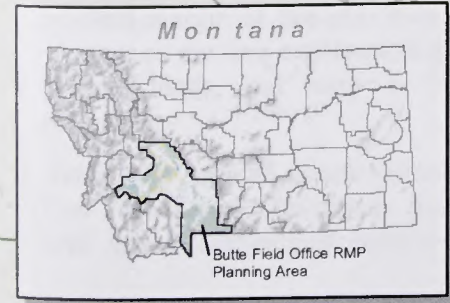
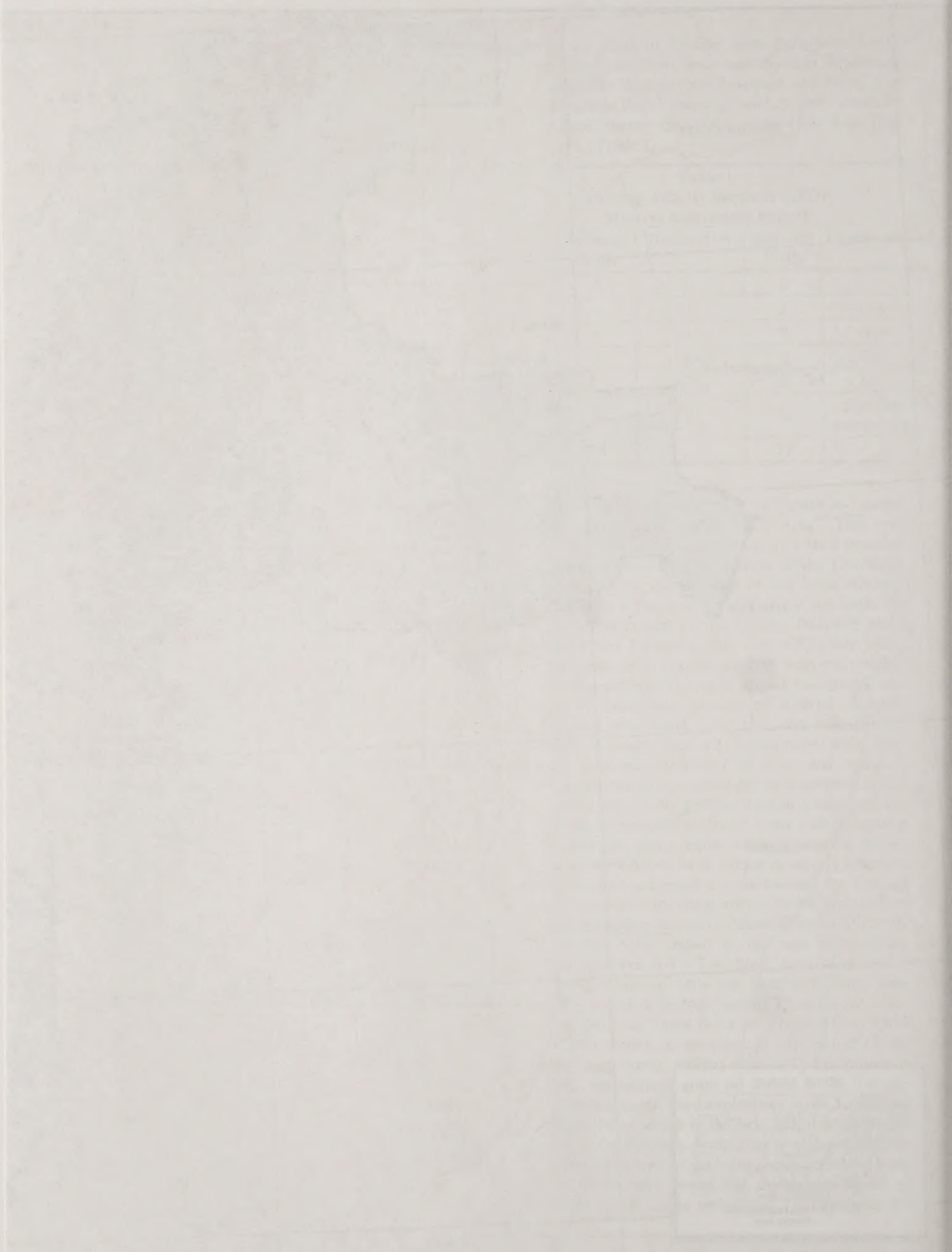


FIGURE A-1
Oil and Gas Occurrence and Development Potential
Mineral Assessment Report
BLM, Butte Field Office
Butte RMP and EIS



adjacent to the fault zone. As only about 20 percent of the land within this basin is underlain by federally administered subsurface mineral rights and more than 87 percent of the surface is privately owned (no BLM surface ownership), it is unlikely that any of the wells would be drilled on federal lands. It is also unlikely that there would be any discoveries in this area.

Area #2 - Area #2 is referred to on **Figure A-1** as the "Imbricate Thrust Zone". The area occurs both to the north and east of Helena, Montana, in a sequence of sediments that are thick and structurally thickened by imbricate thrust faulting associated with the Eldorado and Reff thrust faults. Here Cenozoic sediments unconformably overly Mesozoic and Paleozoic sediments, and basement Precambrian-age rocks. Only two oil and gas wells have been completed in this area between 1975 and 1990. One, the Getty well, was spudded in Mississippian Lodgepole Limestone and drilled in Paleozoic sediments to a final depth of 12,731 feet (3,880 meters). It encountered eleven thrust faults that repeated the Lodgepole Limestone eight (8) times. The other well drilled by Arco, was completed at a depth of 5,002 feet (1,525 meters). It was spudded in the Precambrian Belt sediments and drilled through the Eldorado thrust fault at 2,500 feet (762 meters) and into good potential host rocks of the Mississippian Madison Formation, in which it remained until the bottom of the hole. Unocal drilled a third, very deep (17,818 feet or 5,431 meters) dry well, in the northern portion of this area (**Table 1**). The recently drilled Suncor well, described in the Exploration Drilling section, is present in the northernmost portion of the Planning Area on the Sieban Ranch near Flesher Pass. Area 2 is thought to have moderate oil and gas potential because of the significant thicknesses of Paleozoic sediment (known to contain good reservoir and source rocks) in a zone that is complicated and repeated by thrust faulting that can create stratigraphic and structurally controlled traps by folding and the juxtapositioning of rocks across the thrust faults. Five wells are expected to be drilled in this area within the next 15-20 years. One of these wells is predicted to have significant shows of oil and gas warranting offset drilling of two additional wells. The tests in this area can be deep and expensive, and the structure complex and difficult to understand. Most of the BLM lands in Area 2 occur in two continuous blocks and when combined with split estate lands with federal minerals make up about 20% of the entire area. The large contiguous area in the northeastern portion of Area 2 lies to the east of the intensely imbricated thrust fault zone that has seen exploration drilling along the western margin of this play area. It is possible that one or more of the five exploration wells could be drilled on federal lands, but with a small likelihood of a discovery.

Areas #3 - Area #3 is referred to as the "Helena Salient Gas Play Zone". This zone occurs over a very large area in the east-central portion of the Planning Area

(**Figure A-1**). The area is underlain by Jurassic (locally Cretaceous) through Cambrian age rocks in a sediment package as much as 10,000 feet (3,048 meters) thick. The area has been thrust faulted along north-south structures that have resulted in a series of parallel north-south anticlines and synclines. The entire sequence can be overlain by 1,600 feet (488 meters) (in the west) to as much as 5,000 feet (1,524 meters) of volcanics in the Elkhorn Mountain area. Hydrocarbons have been reported from a well along the east flank of the Mauldow Basin in a well drilled to 11,592 feet (3,533 meters) into Precambrian rock. Gas shows were reported from Cambrian sediments at a depth of about 11,000 feet (3,353 meters). Elsewhere in the area, several shallow wells (<1,005 feet or 306 meters) had oil shows in the Cambrian and Devonian portion of the section. It may be necessary to drill through sub-thrust Precambrian rocks to find deep potential reservoir rocks (10,000-12,000 feet or 3,048-3,658 meters) in the western portion of the area and 15,000-25,000 feet (4,572-7,620 meters) in the eastern portion of the area. Areas of moderate potential in the Helena Salient area are coincident with the location of mapped anticlinal structures. Three wells have been drilled since 1975, one of which was a dry hole drilled in 1991. Four wells are anticipated in the next 15-20 years, additional shows are expected, and one discovery well is predicted with one or two offset wells (limited number of wells because of depth and cost of drilling). Although the BLM owns surface and mineral rights to some 37,000 acres, about 20% of Area 3) more than half of that area lies within the Limestone Hill Montana Army National Guard Training area, which is contaminated with unexploded military ordinance and the subject of a current Legislative EIS that proposes to withdraw the area from future mineral entry. It is unlikely that any federal wells would be drilled in Area 3. Mineral withdrawal normally does not apply to access for the Mineral Leasing Act, therefore access for fluid mineral drilling within the Limestone Hills Training Area may be possible. Assuming the issue involving safe access with respect to unexploded ordinance can be resolved one well may be drilled on Federal lands within the Limestone Hills Training Area.

Area #4 - Area #4 consists of the "Crazy Mountain Oil and Gas Play" on **Figure A-1**. This area occupies most of the northern portions of Gallatin and Park Counties in the easternmost portion of the Planning Area as a broad extensive area of potential oil and gas resources. In particular the area east of Livingston appears to have a moderate potential. Non-marine Upper Cretaceous rocks of the Livingston group cover most of the area and range in thickness from 9,000 feet (2,743 meters) (in the west between Belgrade and Bozeman) to about 1,000 feet (305 meters) along the eastern Planning Area boundary. Concealed beneath these sediments are Cretaceous marine sediments and beneath them a complete sequence of Paleozoic sediments that have

locally been thrust faulted, repeating the section. In this area, the Superior 22-25 Windsor well was drilled on the Hunter Anticline to a depth of 8,990 feet (2,740 meters). This well encountered gas in the Cretaceous Eagle sandstone at 1,950 feet (594 meters). Thrust faults were encountered in this well that bottomed in Cambrian sediments, suggesting that multiple stacked targets may be present at depths of 10,000-20,000 feet (3,048-3,658 meters), in addition to the shallow Cretaceous gas targets. Numerous anticlines have been identified in the section that may represent structural traps. Six wells have been drilled since 1975 and none in recent years (post 1990). It is envisioned that four (4) wells may be drilled in this area including one deep well east of Livingston around the interstate and three shallow wells exploring for Cretaceous gas resources. It is envisioned that the deep well and one of the shallow wells would yield discoveries that warranted step-out drilling of two holes for each discovery. These wells will be either on National Forest System Lands, or more likely, on lands with private mineral rights that make up about 94% of Area 4.

Area #5 - Other places within the Butte Field Office Planning Area, where gas exploration is predicted to occur are areas of coal bed natural gas potential associated with known sub-bituminous coal deposits. Areas of coal bed natural gas potential where activity is predicted in the reasonably foreseeable development scenario occur in one area labeled Area 5 on **Figure A-1**. Overall it is envisioned that initially ten exploration wells would be drilled, and that six of these would discover coal bed natural gas resources that would warrant the drilling of an additional 24 step-out wells to develop the resources (**Table 1**). These would all likely be non-federal wells.

The reasonably foreseeable development scenarios for these areas have been developed for Gallatin and Park Counties by the Bureau of Land Management and the Montana Board of Oil and Gas Conservation (BLM and MBOGC, 2003). It has been estimated that as many as five to 15 wells would be drilled in Gallatin County and that of these, as many as five to 10 would be producing wells from one field (BLM and State of Montana, 2003). Two locations were permitted for exploration

drill holes for coal bed natural gas on untested private land in section 13 and 14 of T. 2 S., R. 7E. in the Trail Creek coal field by the state of Montana in 2001. The wells were scheduled to be drilled to depths of about 5,500 feet (1,676 meters) to test the Upper Cretaceous-age Telegraph Creek-Eagle Sandstone interval along the crest of an anticlinal structure. However, legal challenges involving Gallatin County and the formation of a local zoning district tied up the drilling process and the permits to drill expired in January of 2003. Legal issues need to be resolved in the Trail Creek area before drilling of this previously permitted well might be undertaken. The BLM administers a small number of isolated tracts of split estate minerals in the Trail Creek coal deposit area, but most of the exploration potential lies on private land with separated surface and mineral estate. Assuming that natural gas prices remain high, it is likely that exploration drilling will ultimately be permitted on private land in this area.

In Park County it has been estimated that as many as 10-25 coal bed natural gas exploratory wells might be drilled with as many as 10 to 20 becoming producing wells also from one field (BLM and state of Montana, 2003).

Surface Disturbance Impacts

This section of the Reasonable Foreseeable Development Scenario describes the anticipated disturbances associated with the Drilling Activity Forecast predicted in the preceding section. **Table 2** describes the tasks involved and the surface disturbances that are likely to result from the successful and unsuccessful drilling of conventional and coal bed natural gas wildcat wells, development or step-out drilling, and field production activities of the RFD drilling forecast. The number of acres of disturbance estimated relies on data derived from wildcat well drilling within the Butte Field Office Planning area and on existing small scale production from fields developed within the Overthrust belt of Montana and from data presented in the Final State-wide Oil and Gas EIS (BLM and MBOGC, 2003). Reclaimed acres (regraded and seeded) are assumed to be stabilized after two years.

Table 2
Cumulative Impacts of Oil and Gas Development

Type of Disturbance	Required Tasks		Acres Disturbed Pre-Site Reclamation	Acres Disturbed Post-Site Reclamation
Eleven (11) Unsuccessful Conventional Oil and Gas Wildcat Wells	Well Site - Maximum area of 3.5 acres (about 380 ft. x 400 ft.) cleared per well pad.		38.5	0 (2 years)
	Access Roads – 40 ft. width x lineal footage (3.5 miles or 18,480 lineal feet) or about 17 acres per well site.		187	0 (2 years)
Four (4) Unsuccessful Coal Bed Natural Gas Wildcat Wells	Well Site –Area of approximately 0.25 acres per cleared well pad		1	0 (2 years)
	Access Roads – 0.75 acres of access road disturbance per drill pad		3	0 (2 years)
Three (3) Conventional Gas Fields Discovered and Brought into Small Scale Production	<p>Gas fields would be discovered east of Lincoln (Area #2), northeast of Townsend (Area #3), and east of Livingston (Area #4)</p> <p>Fields would be approximately 3 square miles in surface area.</p> <p>Compressor stations would be necessary along the pipeline route, with one of those stations located within one mile of the main line to boost pipeline gas to the pressure of the main line.</p> <p>Condensate, gas, and water separation would occur at the well sites. Water disposal would be into a lined pit at the surface or water would be injected into the subsurface through a dry hole converted into a water disposal well. Condensate would be shipped by truck (1 truck every 4 days).</p>		Not Applicable	Not Applicable
	3 commercially productive discovery wells (1 per gas field). 2 additional step out wells per discovery well (total of 6 step out wells).	Well Site - Maximum area of 3.5 acres (about 380 ft. x 400 ft.) cleared per well pad.(9 wells total)	31.5	10.8 (2 years)
		Access Roads – 40 ft. width x lineal footage. 3 at 17 acres (3.5 miles long) 6 at 7.3 acres (1.5 miles long)	94.8	52.0 (2 years)
		Pipelines - Trunk lines to existing transmission lines – 25 ft. width x lineal footage (35 miles long). - Field gathering pipelines will follow access roads and no additional disturbance will result.	318	0 (2years)
One (1) Conventional Oil Field Discovered and Brought into Small Scale Production	<p>An oil field is possible in the area east of Livingston, in the vicinity of one of the gas fields identified above.</p> <p>Field would be approximately 1 ½ square miles in surface area.</p> <p>Oil would be transported by truck to refining facility.</p> <p>Oil, gas, and water separation would occur at the well sites. Water disposal would be into a lined pit at the surface or water would be injected into the subsurface through a dry hole converted into a water disposal well. Gas would be used on lease to separate oil and water and to heat oil. Gas not used on lease would be reinjected into the formation for pressure maintenance or would be vented / flared to the atmosphere. If sufficient gas quantities are produced this gas may also be captured and sold. For this analysis all unused gas is assumed to be reinjected for pressure maintenance.</p>		Not Applicable	Not Applicable

Table 2
Cumulative Impacts of Oil and Gas Development

Type of Disturbance	Required Tasks		Acres Disturbed Pre-Site Reclamation	Acres Disturbed Post-Site Reclamation
	- 3 commercially productive wells (one discovery and two step-out wells)	Well Site - Maximum area of 3.5 acres (about 380 ft. x 400 ft.) cleared per well pad.	10.5	3.5 (2 years)
		Access Roads – 40 ft. width x lineal footage. 1 at 17 acres (3.5 miles long) 2 at 7.3 acres (1.5 miles long)	31.6	16.7 (2 years)
		Pipelines Field gathering pipelines will follow access roads and no additional disturbance will result.	0	0
Two (2) Coal Bed Natural Gas Fields Discovered and Brought into Small Scale Production	One coal bed natural gas field is possible; most likely in the Trail Creek-Livingston coal field area east of Bozeman, and one in the Electric coal field area near Gardiner. Each field would be approximately 1.5 square miles in surface area. One in-field compressor station would be necessary and a second station would need to be located within one mile of the main line to boost pipeline gas to the pressure of the main line. Condensate, gas, and water separation would occur at the well sites. Water disposal would be into a lined pit at the surface or water would be injected into the subsurface through a dry hole converted into a water disposal well. Condensate shipped by truck (1 truck every 4 days).		Not Applicable	Not Applicable
	- 30 commercially productive wells (6 discovery and 24 step-out)	Well Site - Maximum area of 0.25 acres cleared per well pad.	7.5	5 (2 years)
		Access Roads – 0.75 acres of access road disturbance per drill pad	31.6	16.7 (2 years)
		Pipelines-18 miles of field gathering pipelines will follow access roads and no additional disturbance will result. 20 miles of sales lines would be laid to the main transmission lines and require no additional disturbance	0	0

PROCEDURES IN OIL AND GAS RECOVERY AND OPERATIONS

GEOPHYSICAL OPERATIONS

Oil and gas reservoirs are discovered by either direct or indirect exploration methods. Direct methods include mapping of surface geology, observing oil or gas seeps, and gathering information on hydrocarbon shows observed in drilling wells. Indirect methods include various types of geophysical exploration such as seismic, gravity, and magnetic surveys, which use remote data gathering techniques to delineate subsurface structures or lithologic changes that are not directly observable, but that may contain or trap oil and gas. Data is often acquired using equipment mounted on surface vehicles or aircraft. Information from geophysical exploration can lead oil companies or others to request that lands be offered for lease, or assist in the selection of drill sites on existing leases. However, a federal oil and gas lease is not required in order to conduct geophysical operations. Existing road systems are used where available. Roads may be cleared of vegetation and loose rocks to improve access for trucks if the permit allows that action.

Blading and road construction for seismic operations are not usually allowed so that environmental impacts are minimized. In areas with rugged terrain or without access roads, and during certain seasons of the year, seismic work is conducted by helicopter rather than by ground vehicles. Other geophysical operations that do not cause additional surface disturbance include remote sensing, and gravity, and aeromagnetic surveying.

Geophysical Permitting Procedures and Regulations

Geophysical operations on and off an oil and gas lease are reviewed by the Federal Surface Management Agency (SMA), which can include the BLM, Bureau of Reclamation, or U.S. Forest Service (USFS). Close cooperation between the operator and the managing agency during geophysical operations minimizes surface impacts and protects other resources.

Notification Process

Geophysical operations on public lands are reviewed by the BLM. Geophysical exploration on public lands requires review and approval following the procedures in 43 CFR Subparts 3150, 3151, and 3154. In the Butte Field Office, the Field Manager is authorized to approve geophysical operations. The responsibilities of the geophysical operator and the Field Manager during geophysical operations are described below.

Geophysical Operator

The operator is required to file a Notice of Intent to Conduct Oil and Gas Exploration Operations (form 3150-4) for operations on public lands administered by the BLM. Maps (preferably 1:24,000 scale topographic maps) showing the location of the proposed lines, access routes and ancillary facilities must accompany the Notice of Intent. When the Notice of Intent is filed, the authorized officer may request a prework conference or field inspection. Special requirements or procedures that are identified by the authorized officer are included in the Terms and Conditions for Notice of Intent to Conduct Geophysical Exploration (form 3150-4 and a copy of the state requirements). Any changes in the original Notice of Intent must be submitted in writing to the authorized officer. Written approval must be secured before activities proceed.

Bonding of the operator is required. A copy of proof of satisfactory bonding shall accompany the Notice of Intent. Proper bonding may include a \$5,000 individual, \$25,000 statewide, or \$50,000 nationwide geophysical exploration bond. In lieu of an exploration bond, a statewide or nationwide oil and gas bond may be used if it contains a rider for geophysical exploration. The operator is required to comply with applicable federal, state, and local laws such as Federal Land Policy and Management Act of 1976, the National Historic Preservation Act of 1966, and the Endangered Species Act of 1973, as amended. Earth-moving equipment shall not be used without prior approval. Operators may be required to submit an archeological evaluation and the agency provide NEPA documentation for cultural and wildlife resources if dirt work or other surface disturbance is contemplated, or if there is reason to believe that these resources may be adversely affected.

When geophysical operations have been completed including any required reclamation or rehabilitation, the operator is required to file a Notice of Completion (form 3150-5) including certification that all terms and conditions of the approved Notice of Intent have been fulfilled. The operator must also submit a map that shows the actual line location, access route, and other survey details.

BLM Field Manager (authorized officer)

The authorized officer is required to contact the operator within five working days after receiving the Notice of Intent to explain the terms of the notice, including the "Terms and Conditions for Notice of Intent to Conduct Geophysical Exploration," current laws, and BLM-administrative requirements. At the time of the prework conference or field inspection, written instructions or orders are given to the operator. The authorized officer is responsible for the examination of resource values to determine appropriate surface protection and reclamation measures. Compliance inspections during the operation ensure that stipulations are followed. The

authorized officer is required to make a final inspection following filing of the Notice of Completion. Compliance inspections upon completion of work ensure that required reclamation is properly completed. When reclamation is approved, obligation against the operator's bond is released. The BLM has 30 days after receipt of the Notice of Completion to notify the operator whether the reclamation is satisfactory or if additional reclamation work is needed. Bonding liability will automatically terminate within 90 days after receipt of the Notice of Completion unless the authorized officer notifies the operator of the need for additional reclamation work.

State Standards

Geophysical operators register with the state through the County Clerk and Recorder's office. State regulations include requirements for permitting geophysical activities such as shothole locations, drilling techniques, plugging techniques, bonding, and reclamation.

Mitigation

When a geophysical Notice of Intent is received, restrictions may be placed on the application to protect resource values or to mitigate impacts. Many of these requirements may be the same as the oil and gas lease stipulations adopted in the RMP. Other less restrictive measures may be used when impacts to resource values will be less severe. This is due in part to the temporary nature of geophysical exploration. Seasonal restrictions may be imposed to reduce conflicts with wildlife, watershed damage, and hunting activity. The decisions concerning the level of protection required are made on a case-by-case basis when a Notice of Intent is received.

LEASING PROCESS

Federal oil and gas leasing authority is found in the 1920 Mineral Leasing Act, as amended, for public lands and the 1947 Acquired Lands Leasing Act, as amended, for acquired lands. Leasing of federal oil and gas is affected by other acts such as National Environmental Policy Act of 1969, the Wilderness Act of 1964, National Historic Preservation Act of 1966, the Endangered Species Act of 1973, Federal Land Policy and Management Act of 1976, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. Regulations governing federal oil and gas leasing are contained in 43 CFR Part 3100 with additional requirements and clarification found in Onshore Operating Orders and Washington office manuals, handbooks and instruction memorandums.

The 1920 *Mineral Leasing Act* provides that all public lands are open to oil and gas leasing unless a specific order has been issued to close an area. Leasing procedures for oil, conventional gas, and coal bed natural gas are the same.

The lease grants the right to explore, extract, remove, and dispose of oil and gas deposits that may be found in

the leased lands. The lessee may exercise the rights conveyed by the lease subject to the lease terms and attached stipulations, if any.

Lease rights may be subject to lease stipulations and permit approval requirements. Stipulations and permit requirements describe how lease rights are modified. Lease constraints or requirements may also be applied to applications for permit to drill on existing leases provided the constraints or requirements are within the authority reserved by the terms and conditions of the lease. The stipulations and conditions of approval must be in accordance with laws, regulations, and lease terms. The lease stipulations and permit conditions of approval allow for management of federal oil and gas resources in concert with other resources and land uses. The BLM planning process is the mechanism used to evaluate and determine where and how federal oil and gas resources will be made available for leasing. In areas where oil and gas development may conflict with other resources, the areas may be closed to leasing. Areas where oil and gas development could coexist with other land uses or resources will be open to leasing. Leases in these areas will be issued with standard lease terms or with added stipulations based upon decisions in the land use document. Added stipulations are a part of the lease only when environmental and planning records demonstrate the necessity for the stipulations (modifications of the lease).

Currently, leases are issued as either competitive leases or noncompetitive leases with 10-year terms.

Competitive leases will be sold to the highest qualified bidder at oral auctions that are held at least quarterly. Tracts that receive no bid at the sale are available for the filing of noncompetitive offers for two years following the sale. All offers filed the day after the sale (referred to as day-after-the-sale filings) are considered simultaneously filed. This means that if there is more than one offer filed for a specific parcel the day after the sale, a drawing must be held to determine the priority on multiple offers. Noncompetitive offers filed after that time are on a first-come first-served basis. If there are no offers filed for a parcel for the two-year period after the sale, the lands must be nominated again for competitive leasing. Rental payments for these leases will be \$1.50 per acre for the first 5 years and \$2.00 per acre thereafter until production is established. If the lessee establishes hydrocarbon production, the leases can be held for as long as oil or gas is produced. The royalty rate for leases issued following the 1987 Oil and Gas Leasing Reform Act is 12-1/2 percent one-half of which is returned to the State of Montana on public domain lands (not acquired lands). Minimum royalty is the same amount as the rental. Future interest leases are available for entire or fractional mineral estates that have not reverted to federal ownership. These are minerals that are reserved by the grantor for a specific period of time in warranty deeds to the United States. Any future interest leases

may be obtained only through the competitive bidding process and are made effective the date of vesting of the minerals with the United States.

Resource Management Plan Maintenance

New information may lead to changes in existing resource inventories. New use areas and resource locations may be identified or use areas and resource locations that are no longer valid may be identified. These resources usually cover small areas requiring the same protection or mitigation as identified in this plan. Identification of new areas or removal of old areas that no longer have those resource values will result in the use of the same lease stipulation identified in this plan. These areas will be added to the existing data inventory without a plan amendment. In cases where the changes constitute a change in resource allocation outside the scope of this plan, a plan amendment would be required.

Lease Stipulations

Certain resources in the planning area require protection from impacts associated with oil and gas activities. The specific resource and the method of protection are contained in lease stipulations. Lease stipulations are usually no surface occupancy, controlled surface use, or timing limitation. A notice may also be included with a lease to provide guidance regarding resources or land uses. While the actual wording of the stipulations may be adjusted at the time of leasing, the protection standards described will be maintained.

Controlled Surface Use

Use or occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights. Controlled surface use is used for operating guidance, not as a substitute for the no surface occupancy or timing stipulations.

No Surface Occupancy (NSO)

Use or occupancy of the land surface for fluid mineral exploration or development is prohibited in order to protect identified resource values. The no surface occupancy stipulation includes stipulations which may have been worded as No Surface Use and Occupancy," "No Surface Disturbance," "Conditional No Surface Occupancy," and "Surface Disturbance or Occupancy Restriction (by location)."

Timing Limitation (Seasonal Restriction)

Prohibits surface use during specified times to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less

stringent, project-specific mitigation measures would be insufficient.

PERMITTING

A federal lessee or operator is governed by procedures set forth in the Code of Federal Regulations at 43 CFR Part 3160, Onshore Oil and Gas Order No. 1, "Approval of Operations on Onshore Federal and Indian Oil and Gas Leases," issued under 43 Code of Federal Regulations (CFR) 3164 and other orders and notices.

The lessee may conduct lease operations after lease issuance. However, proposed drilling and associated activities must be approved in advance before beginning operations. Therefore, before beginning construction or the drilling of a well, the lessee or operator must file an Application for Permit to Drill (APD) with the BLM Great Falls Oil and Gas Field Station. A copy of the application will be posted in the Field Station and Butte Field Office, and if applicable, in the office of the Surface Management Agency (SMA) for a minimum of 30 days for review by the public. After 30 days, the application can be approved in accordance with (a) lease stipulations, (b) Onshore Oil and Gas Orders, and (c) Onshore Oil and Gas regulations (43 CFR Part 3160) if it is administratively and technically complete.

Evidence of bond coverage for lease operations must be submitted with the application. Bond amount must not be less than a \$10,000.00 lease bond, a \$25,000.00 statewide bond or a \$150,000.00 nationwide bond.

Pre-drill on-site inspections will be conducted for all wells. The inspection makes possible selection of the most feasible well site and access road from environmental, geological, and engineering points of view. The purpose of the field inspection is to evaluate the operator's plan, assess the situation for possible impacts, and to formulate resource protection stipulations. Surface use and reclamation requirements are developed during the on-site inspection that is usually conducted within 15 days after receipt of the Notice of Staking (NOS) or APD. For operations proposed on privately-owned surface, if the operator after a good-faith effort is unable to reach an agreement with the private surface owner, the operator must post a bond to cover loss of crops and damages to tangible improvements prior to approval of the APD.

Normally, site-specific mitigations in the form of conditions of approval are added to the APD for protection of surface and subsurface (including groundwater) resource values in the vicinity of the proposed activity. The BLM is responsible for preparing environmental documentation necessary to satisfy the National Environmental Policy Act (NEPA) requirements and provide any mitigation measures needed to protect the affected resource values.

Conditions of approval implement the lease stipulations and are part of the permit when environmental and field reviews demonstrate the necessity for operating constraints or requirements. A surface restoration plan is part of an approved permit, either an APD or Sundry Notice that includes other surface-disturbing activities. The authorized officer will act on the application in one of two ways:

Within 30 days after the operator has submitted a complete application including incorporating any changes that resulted from the onsite inspection the BLM will:

(1) approve the application subject to reasonable conditions of approval if the requirements of the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), or other applicable law have been completed and, if on FS lands, FS has approved the Surface Use Plan of Operations; or

(2) notify the operator that it is deferring action on the permit. The notice of deferral must specify:

(a) any action the operator could take that would enable BLM to issue a final decision on the application, with FS concurrence if appropriate. Actions may include but are not limited to; assistance with data gathering or assistance with preparation of analyses and documents;

(b) and if necessary, a list of actions that BLM or the FS, if appropriate, need to take, including completing requirements of NEPA or other applicable law and a schedule for completing these actions.

The operator has 2 years from the date of the notice of deferral to take the action specified in the notice. If all analyses required by NEPA, NHPA, ESA and other applicable laws have been prepared, BLM and with FS concurrence, if appropriate, shall make a decision on the permit within 10 days of receiving a report from the operator addressing all of the issues or actions specified in the deferral notice and certifying that all required actions have been taken. If the operator has not completed the actions specified in the notice, BLM may deny the permit at any time later than 2 years from the operator's receipt of the deferral notice."

For drilling operations on lands with state or private mineral ownership, the lessee must meet the requirements of the mineral owner and the state regulatory agency. The BLM does not have jurisdiction over nonfederal minerals; however, the BLM has surface management responsibility in situations of BLM surface over nonfederal mineral ownership.

When final approval is given by the BLM, the operator may begin construction and drilling operations. Approval of an APD is valid for one year. If construction does not begin within one year, the permit must be reviewed prior to approving another APD.

A Sundry Notice is used to approve other surface and subsurface lease operations. When a well is no longer useful, the well is plugged and the surface reclaimed. A Sundry Notice is also used to approve well plugging and reclamation operations, although verbal approval for plugging may be given for a well that was drilled but not completed for production.

The period of bond liability is terminated after all wells covered by the bond are properly plugged and the surface reclaimed. The lands may then become available for future leasing.

APPLICATION FOR PERMIT TO DRILL

Applications for Permit to Drill are approved for the Butte Field Office by the supervisor of the Great Falls Oil and Gas Field Station. The approved APD includes Conditions of Approval, and Informational Notices that cite the regulatory requirements from the Code of Federal Regulations, Onshore Operating Orders and other guidance.

CONDITIONS OF APPROVAL

Conditions of approval are mitigation measures that implement restrictions in light of site-specific conditions. General guidance for conditions of approval and surface operating standards is found in the BLM and USFS brochure entitled "Surface Operating Standards for Oil and Gas Exploration and Development" (USDI, BLM1989c) and BLM Manual 9113 entitled "Roads". The BLM commonly applies best management practices when approving APDs. The sources of many of these may be found in RMP Appendix D at page 4.

The following mitigation measures may be applied to approved permits to drill as conditions of approval. The listing is not all-inclusive, but presents some possible conditions of approval that may be used in the planning area. The wording of the condition of approval may be modified or additional conditions of approval may be developed to address specific conditions.

Surface Conditions

- a) The access road on the BLM surface will not be bladed unless prior BLM approval is obtained.
- b) The operator will be responsible for weed control on the access road, well location, and pipeline for the life of the well.
- c) The operator will clean the undercarriage of all rigs prior to entering onto the leasehold to reduce the chances for noxious weed infestations.
- d) Topsoil is to be removed and stockpiled. Operator will be required to cover the topsoil pile to prevent the loss of topsoil to wind erosion. Operator must cover the topsoil with a biodegradable mesh fabric that allows water and air to circulate through the

- topsoil. Operator cannot cover the topsoil with any type of impermeable fabric. Operator will be responsible for weed control on the topsoil stockpile.
- e) Avoid constructing reserve pits in natural watercourses or areas of shallow groundwater. Water courses include lake beds, gullies, draws, streambeds, washes, arroyos, or channels that are delineated on a 1:24,000 USGS quadrangle map or have a hydrologic connection to streams, rivers, or lakes. The reserve pit should normally be located entirely in cut material. The preferred method of reserve pit construction on steeply sloping sites is to locate the pit on the drill pad next to the high wall. The pits are constructed totally in cut at such locations. If this is not possible, at least 50 percent of the reserve pit should be constructed below original ground level to help prevent failure of the pit dike. Fill dikes should be properly compacted in lifts. The necessary degree of compaction depends on soil texture and moisture content. The pit should be designed to contain all anticipated drilling muds, cuttings, fracture fluids, and precipitation while maintaining at least 2 feet of freeboard. Pits improperly constructed on slopes or poor soil types may leak along the plane between the natural ground level and the fill. There is a significant potential for pit failure in these situations. When constructing dikes for pits or impoundments with fill embankment, a keyway or core trench should be excavated to a minimum depth of 2 to 3 feet below the original ground level. The core of the embankment can then be constructed with compacted, water-impervious material.
 - f) Containment structures sufficiently impervious to prevent a discharge to waters of the US, such as containment dikes, containment walls, drip pans, or equivalent protection actions are to be constructed and maintained around all qualifying bulk oil storage facilities, including tank batteries, consistent with the Environmental Protection Agency's Spill Prevention, Control, and Countermeasure (SPCC) regulation (40 CFR 112). The containment structure must have sufficient volume to contain, at a minimum, the content of the largest storage tank containing liquid hydrocarbons within the facility/battery and sufficient freeboard to contain precipitation, unless more stringent protective requirements are deemed necessary by the authorized officer. Containment dikes are not to be constructed with topsoil or coarse, insufficiently impervious spoil material. Containment is strongly suggested for produced water tanks. Chemicals should be placed within secondary containment and stored so that the containers are not in contact with soil or standing water and product and hazard labels are not exposed to weathering.
 - g) Rehabilitation of upland sites following disturbance would use the plant species listed in **Table 3** for seeding. The species used for rehabilitation would vary depending on the adjacent habitat conditions, site potential, soils, and precipitation. Species not in the following list could be added if site conditions warrant, species availability changes or if there are large acreages are involved.
 - h) All permanent structures will be painted the neutral color of Sand Beige (5Y 6/3), Desert Brown (10YR 6/3), Carlsbad Canyon (2.5Y 6/2) or Slate Gray (5Y 6/1) as displayed in the Standard Environmental Color chart (available at the BLM office) or other acceptable color approved by the authorized officer to blend in with the surrounding landscape.
 - i) If the well is a dry hole, Operator will be required to fence the entire disturbed area of the location to allow the seedlings and vegetation to re-establish. This fencing must be stock tight and must remain in place until the BLM requests otherwise.
 - j) The Operator will be responsible for control of noxious weeds occurring as a result of lease operations. The Surface Management Agency will be responsible for approval of weed control programs.
 - k) Prior to the use of herbicides on public land, the applicant will have to obtain from the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, weed(s) to be controlled, method of application, location of storage and disposal of containers and any other pertinent information deemed necessary by the authorized officer. Operators must monitor disturbed areas annually from June through August for the presence of noxious weeds. Monitoring must begin prior to disturbance.
 - l) Within the Distribution Zone of grizzly bears, food storage regulations will be followed to minimize bear-human conflicts. Proper food storage is essential to successful human-bear management. "Food" includes actual food, trash, recyclables, toiletries, cosmetics, first aid kits, pet food, sunscreen, baby wipes, scented tissue, beverage cans and bottles, canned food, mosquito repellent, tobacco products, and any related items with a scent. All food items, garbage, beverages, coolers, stoves, grills, cooking utensils, food containers, and pet food not in immediate use (day or night) must be stored in Bear Resistant Containers (BRC), stored in a closed vehicle constructed of solid, nonpliable material or be hung from food poles where provided or limbs of trees. Food items must be hung 10 feet clear of the ground at all points and 4 feet horizontally from any supporting tree or pole. Camps and job sites must be clean at all times. No garbage will be burned or buried. All garbage will be removed from the site.

Table 3 Rehabilitation Species List			
Common Name	Scientific Name	4 Code	6 Code
12 to 14 inch precipitation zone			
Western Wheatgrass	<i>Pascopyrum smithii</i>	PASM	PASSMI
Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i>	PSSP6	PSESPI
Thickspike Wheatgrass	<i>Elymus macrourus</i>	ELMA7	ARGDAS
Slender Wheatgrass	<i>Elymus trachycaulus</i>	ELTR7	ELYTRA
Green Needlegrass	<i>Nassella viridula</i>	NAVI4	STIVIR
Needle And Thread	<i>Hesperostipa comata</i>	HECO26	STICOM
Blue Flax	<i>Linum perenne</i>	LIPE2	LINPER
Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	SPCO	SPHCOC
Silky Lupine	<i>Lupinus sericeus</i>	LESE4	LUPSER
Wyoming Big Sage	<i>Artemisia tridentate</i>	ARTRW8	ARTTRIW
Woods' Rose	<i>Rosa woodsii</i>	ROWO	ROSWOO
15 to 19 inch precipitation zone			
Basin Wildrye	<i>Leymus cinereus</i>	LECI4	LEYCIN
Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i>	PSSP6	PSESPI
Slender Wheatgrass	<i>Elymus trachycaulus</i>	ELTR7	ELYTRA
Idaho Fescue	<i>Festuca idahoensis</i>	FEID	FESIDA
Sheep Fescue	<i>Festuca ovina</i>	FEOV	FESОВI
Sandberg Bluegrass	<i>Poa secunda</i>	POSE	POASEC
Blue Flax	<i>Linum perenne</i>	LIPE2	LINPER
Silky Lupine	<i>Lupinus sericeus</i>	DESE4	LUPSER
Wyoming Big Sage	<i>Artemisia tridentate</i>	ARTRV	ARTTRIV
Woods' Rose	<i>Rosa woodsii</i>	ROWO	ROSWOO

- m) Operator road use activities on BLM lands must conform to existing travel plans.

Downhole Conditions

- Surface casing shall have centralizers on each of the bottom three joints and shall be cemented back to surface.
- BOP system shall be consistent with Onshore Oil and Gas Order No. 2, 2M system.
- The operator shall obtain verbal approval prior to initiating side-tracking operations. At the time of approval, the operator must identify the proposed azimuth, kick-off point, inclination rate (angle build rate), and the estimated closure or horizontal length to be drilled. All wellbore paths, i.e. different orientations of bottom hole locations, require prior approval.
- The operator shall have sufficient weighting materials and loss circulation materials on location

in the event of a pressure kick or in the event of loss circulation.

Informational Notice

- Approval of this APD does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease, which would entitle the applicant to conduct operations thereon.
- The lessee shall comply with applicable laws and regulation; with the lease terms, Onshore Oil and Gas Orders; NTL's; and with other orders and instructions of the authorized officer.
- A complete copy of the approved APD must be on the well site and available for reference during the construction and drilling phase.
- Any deviation from the terms of this APD requires prior approval.
- This drilling permit is valid for either 1 year from the approval date or until lease expiration, whichever occurs first.

- f) Each drilling, producing, or abandoned well shall be identified with the operator's name, the lease serial number, the well number, and the surveyed description of the well (footages or the quarter section, the section, township, and range). All markings must be legible, and in a conspicuous place.

Notification Requirements

- a) Notify this office at least 12 hours before beginning dirt work*.
- b) Notify this office verbally at least 6 hours before the well is spudded.
- c) Notify this office verbally at least 6 hours prior to running/cementing casing.
- d) Notify this office verbally at least 6 hours prior to conducting BOP tests.
- e) Notify this office at least 6 hours prior to plugging for verbal plugging orders.
- f) BLM Representative – Great Falls Field Station Office Telephone No. (406) 791-7700:
- g) After hours and weekend contacts are:
 - i. Petroleum Engineer Technician
 - ii. Petroleum Engineer
 - iii. Environmental Specialist
 - iv. Field Station Supervisor

Plugging Requirements

- a) Prior approval for abandonment must be obtained. Initial approval for abandonment during drilling operations may be verbal but must be followed by written notification on Form 3160-5, in triplicate.
- b) Upon completion of the approved plugging, the operator will cut the casing off four feet below reclaimed ground level and a ¼" x 12" x 12" plate (with a ⅛" weep hole) shall be welded onto a fitting to be screwed into a collar either welded or screwed to the production casing. **The standard aboveground dry hole marker is accordance with 43 CFR 3162.6(d) has been waived by the Great Falls Field Station.** Pits must be fenced until dry or pumped and then filled in and recontoured unless otherwise approved by the Field Station Supervisor.
- c) The following minimum information shall be permanently placed on the plate: "Fed" or "Ind" as applicable; "Lease Number, Operator, Well Number, and Location by quarter/quarter, Section, Township, and Range."

Reports and Notifications

- a) All submitted information not marked "CONFIDENTIAL INFORMATION" is subject to public disclosure in accordance with 43 CFR 3100.4.

- b) Production Startup Notification is required not later than the 5th business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than 90 days, the operator shall notify the authorized officer by letter or sundry notice, Form 3160-5, or orally to be followed by a letter or sundry notice, of the date on which such production has begun or resumed.

Hazardous Materials

- a) Operators and their contractors are to ensure all production, use, storage, transport, and disposal of hazardous materials resulting from the proposed project is in accordance with all applicable Federal, State and local laws, regulations and guidelines, existing or hereafter enacted or promulgated that effect the management of hazardous material, as defined in this paragraph. Hazardous material means any substance, pollutant, or contaminant listed as a hazardous substance under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended, 42 USC 9601 et seq., and its regulations (found at 40 CFR 302). The definition of hazardous substances under CERCLA includes "hazardous waste" defined in the Resource Conservation and Recovery Act (RCRA) of 1976, as amended, 42 USC 6901 et seq., and its regulations. The term also includes any extremely hazardous substances defined by 40 CFR 355 and any nuclear or byproduct material defined by the Atomic Energy Act of 1954, as amended, 42 USC 2011 ET seq. The term does not include petroleum, including crude oil or any fraction thereof not otherwise listed or designated as a hazardous substance under CERCLA section 101 (14), 42 USC 9601 (14), or natural gas.
- b) Only drilling mud, drilling fluids, cuttings, native soils, cementing materials and/or approved pit solidifying materials will be placed in the reserve or working pits.
- c) Nonexempt wastes will not be mixed with exempt wastes.

Environmental Obligations and Disposal of Produced Water

- a) The Operator is required to take all necessary steps to prevent any death of a migratory bird in pits or open vessels associated with the drilling, testing, completion, or production of this well. The death of any migratory bird found in such a pit or open vessel is a violation of the Migratory Bird Treaty Act and is considered a criminal act. Any deaths of migratory birds attributable to pits or open vessels associated with drilling, testing, completing, or production operations must be reported to this office

and the United States Fish and Wildlife Service within 24 hours.

- b) The BLM may require that the pit be designed or the open vessel be covered to deter the entry of birds in any facility associated with drilling, testing, completing, or production of this well. Fencing, screening, and netting of pits may be required as a means to deter bird entry. These conditions would most likely be imposed to prevent the entry of migratory birds if oil is left in pits or open vessels after the cessation of drilling or completion operations, if water disposal pits consistently receive oil, or if pits or open vessels are used repeatedly for emergency situations which result in the accumulation of oil.
- c) Voluntary pit fencing, screening, and netting, or sealing vessels is encouraged thus avoiding potential instances that may result in the death of a migratory bird.
- d) With BLM approval, water produced from newly completed wells may be temporarily disposed of into unlined pits for up to 90 days. During this initial period, application for the permanent disposal method must be made in accordance with Onshore Order No. 7.

Paleontological/Cultural Stipulations

Paleontological and archaeological field checks by BLM personnel or other authorized personnel will occur prior to disturbance as deemed appropriate by the BLM. A BLM-approved archaeologist or paleontologist will conduct monitoring during surface-disturbing activities. Paleontological or cultural resource sites will be avoided or mitigated as necessary prior to disturbance. Any cultural or paleontological resource discovered by an operator or any person working on his/her behalf will be reported immediately to the BLM, and all operations that may further disturb such resources will be suspended until written authorization to proceed is issued by the BLM authorizing officer. An evaluation of the discovery will be made by the BLM to determine appropriate actions to prevent the loss of significant resources.

CONSTRUCTION

Construction of the access road and the well site is necessary before drilling operations begin. The extent of surface disturbance necessary for construction depends on the terrain, depth of the well, drill rig size, circulating system, and safety standards.

The depth of the drill test determines the size of drill rig needed, and therefore, the size of the work area necessary, the need for all-weather roads, water requirements, and other needs. The terrain influences the construction problems and the amount of surface area to be disturbed. Reserve pit size may vary because of well depth, drill rig size, or circulating system.

Access roads to well sites in the planning area usually consist of running surfaces 14 to 24 feet wide that are ditched on one or both sides. Many of the roads constructed will follow existing roads or trails. New roads might be necessary because existing roads are not at an acceptable standard. For example, a road may be too steep so that realignment is necessary.

Roads can be permanent or temporary, depending on the success of the well. The initial construction can be for a temporary road; however, it is designed so that it can become permanent if the well produces. Not all temporary roads constructed are immediately rehabilitated when the drilling stops. A temporary road is often used as access to other drill sites. The main roads and temporary roads require graveling to be maintained as all-weather roads. This is especially important in the spring. Access roads may be required to cross public lands to a well site located on private or state lands. The portion of the access road on public land would require a BLM right-of-way.

The amount of level surface required for safely assembling and operating a drilling rig varies with the type of rig, but averages 300 feet by 400 feet. Approximately 3-1/2 acres would be impacted by well site construction. The area is cleared of large vegetation, boulders, or debris. Then the topsoil is removed and saved for reclamation. A level area is then constructed for the well site, which includes the reserve pit.

Bulldozers and motor scrapers are typically used to construct the well pad. The well pad is flat (to accommodate the drill rig and support equipment) and large enough to store all the equipment and supplies without restricting safe work areas. The drill rig must be placed on "cut" material rather than on "fill" material to provide a stable foundation for the rig. The degree of cutting and filling depends on terrain; that is, the flatter the site, the less dirt work is required.

Hillside locations are common, and the amount of dirt work varies with the steepness. A typical well pad will require a cut 10 feet deep against the hill and a fill 8 feet high on the outside. It is normal to have more cut than fill to allow for compaction, and any excess material is then stockpiled. Eventually, when the well is plugged and abandoned, excavated material is put back in its original place.

Reserve pits are normally constructed on the well pad. Usually the reserve pit is excavated in "cut" material on the well pad. The reserve pit is designed to hold water, drill cuttings, and used drilling fluids. Generally, reserve pits are rectangular in shape and 8 to 12 feet deep, however, the size and number of pits depends on the depth of the well, circulating system and anticipated down hole problems, such as excess water flows. The reserve pit can be lined with a synthetic liner to contain pit contents and reduce pit seepage. Not all reserve pits are lined; however, BLM can require a synthetic liner

based upon factors such as soils, pit locations, ground water, and drilling mud constituents. The operator can elect to line the reserve pit without that requirement. Pits may be divided into compartments separated by berms for the proper management of derived waste (e.g., drill cuttings, mud, water flows).

An adequate supply of water is required for drilling operations and other uses. During drilling operations, water is continually transported to the rig location. Approximately 1,680,000 gallons of water are required to drill an oil or gas well to the depth of 9,000 feet. The sources of water can be a water well at the drill site or remote sources such as streams, ponds, or wells. The water is transported to the site by truck or pipeline. Pipelines are normally small diameter surface lines. The operator must file for and obtain all necessary permits for water from the state of Montana. On public lands, an operator must have the BLM's permission before surface water can be used.

DRILLING OPERATIONS

Starting to drill is called "spudding in" the well. Initially, drilling proceeds rapidly due to the presence of unconsolidated or shallow, poorly consolidated rock formations. Drilling is accomplished by rotating special bits under pressure at the end of drill pipe (string) extended down the hole as it advances. While drilling, the rig derrick and associated hoisting equipment bear most of the drill pipe (string) weight. The weight on the bit is generally a small fraction of the total drill string weight. The combination of rotary motion and weight on the bit causes rock to be chipped away at the bottom of the hole.

Drilling fluid or mud is circulated through the drill pipe to the bottom of the hole, through the bit, up the bore of the well, and finally to the surface. When the mud emerges from the hole, it goes through equipment used to screen and remove rock chips and sand-size solids. When the solids have been removed, the mud is placed into holding tanks and from the tanks it is pumped back into the well. The mud is maintained at a specific weight and viscosity to cool the bit, seal off any porous zones (protect aquifers or prevent damage to producing zone productivity), subsurface pressure control, lubrication of the drill string, clean the bottom of the hole, and bring the rock chips to the surface.

There are three common types of drilling fluids: water-based, oil-based, and synthetic. Water-based muds are the most common and are largely made up of water and bentonite, clay that has special properties used to maintain proper viscosity and other properties over a wide range of drilling conditions. Oil-based mud is used for subsurface conditions where water may react with shale and cause caving and sloughing of the sides of the well bore. Synthetic drilling fluids are used for special conditions and have become more common in recent

years. They are composed of organic polymers or other chemicals and are often designed to be environmentally benign. Additives are used to maintain the drilling mud properties for specific conditions that may be encountered during drilling.

As drilling progresses for a vertical well, pipe or casing is placed as a liner in the hole. Casing consists of steel pipe that is placed into the hole to prevent the collapse of the hole, to protect aquifers, and to isolate producing zones from other formations. Several strings of casing, that have different purposes, may be placed into the well. The first string of pipe is the conductor pipe, which stabilizes the hole near the surface. The second string of pipe placed in the hole is for surface casing, which is set deep enough to reach a competent rock below the deepest usable freshwater aquifer.

The surface casing is set and cemented in the hole by pumping cement between the casing and the well bore wall. Surface casing acts as a safety device to protect freshwater zones from drilling fluid contamination. To prevent the well from "blowing-out" in the event the drill bit hits a high-pressure zone, blowout preventers are mounted on top of the surface casing. If high-pressure zones are encountered that cannot be controlled with weighting using mud additives (drilling fluids are the first line of defense against a blowout), the blowout preventers can be closed through a system of hydraulically activated valves and manifolds to effectively seal the well and prevent the uncontrolled flow of fluids.

After the surface casing is set, a smaller drill bit that fits inside the surface casing is installed and drilling resumes. Depending on well conditions, additional strings of casing called intermediate casing may be installed and cemented into place. Conditions resulting in the need for intermediate casing include freshwater zones and sloughing formation zones. Casing prevents the flow of freshwater into the wellbore, and conversely prevents drilling fluids from infiltrating porous formations with low internal pressures. Casing also prevents mixing of waters from different formations (interformational mixing) where water within the formations is of differing quality.

All cementing operation plans are reviewed to assure cement is placed at the appropriate depths and a sufficient quantity is utilized to effectively seal all freshwater-bearing formations from contamination by interformational mixing or migration of fluids.

Drilling operations are continuous, 24 hours a day, 7 days a week. There are three 8-hour or two 12-hour shifts a day. Pickups or cars are used for workers' transportation to and from the location.

If no oil or gas is encountered, the well is called a "dry hole" and it is plugged with cement and abandoned in accordance with state and federal requirements. The drill site and access roads are rehabilitated according to

stipulations and conditions attached to the approved APD and the drilling equipment is moved to another location.

If the well is a producer, casing is set and cemented in place.

Directional drilling may be used where the drill site cannot be located directly over the drilling target. There are limits to both the degree that the well bore can be deviated from the vertical and the horizontal distance the well can be drilled away from the well site.

Horizontal wells are drilled similarly to directional wells, except that the bottomhole location of the well is not a single point, but rather a lateral horizontal section. They are drilled to increase the recovery oil and gas reserves from vertically fractured reservoirs, or reservoirs with directional permeability.

PRODUCTION AND DEVELOPMENT

Production

Production begins when a well yields oil or gas in commercial quantities. If formation pressure is sufficient to raise oil to the surface, the well is completed as a flowing well. A pumping unit is installed if the formation pressure is not sufficient to bring the oil to the surface.

When the well is completed as a free-flowing well, an assembly of valves and special connections known as a "Christmas tree" (so called because of its many branch-like fittings) is installed on top of the casing to regulate the flow of the well. Later, when the natural pressure declines, the Christmas tree can give way to a simple wellhead arrangement of valves and a pumping unit to lift the oil artificially. Many pumping units are "beam" style pumps that are powered by electric motors or gasoline engines. Most gas wells produce by natural flow and do not require pumping. Surface facilities at a flowing well are usually in a small area containing a gas well Christmas tree, a dehydrator, a produced water pit, and a meter house. Separators, condensate tanks, and compressors may be included. Some gas wells require continuous water pumping as water entering the well chokes off the gas flow.

Development

New field development may be analyzed under NEPA by means of an environmental assessment (EA) or environmental impact statement (EIS) usually after the second or third confirmation well is drilled. The operator should then have an idea of the extent of drilling and disturbance required to extract and produce the oil and gas. When an oil or gas discovery is made, a well spacing pattern must be established before development drilling begins.

Development can take years and include from one or two wells to more than a hundred wells per field. However, the reasonably foreseeable development scenario for this planning document should only forecasts two additional wells per field. Roads to producing wells are upgraded to all-weather roads as necessary. Pipelines, electrical transmission lines, separators, dehydrators, sump pits, and compressor stations soon follow. Sometimes oil and gas processing facilities are built in or adjacent to the field.

Further Seismic Testing

More detailed seismic work can be done to achieve better definition of the petroleum reservoir. Diagonal seismic lines can be required to tie the previous seismic work to the discovery well. The discovery well can be used to conduct studies to correct the previous seismic work and provide more accurate subsurface data.

Spacing Requirements

A well spacing pattern must be established before development drilling begins. Information considered in establishment of a spacing pattern includes data from the discovery well on porosity, permeability, pressure, composition, and depth of formations in the reservoir; well production rates and type (predominantly oil or gas); and the economic effect of the proposed spacing on recovery. The state of Montana establishes well spacing patterns for both exploratory and development wells which the BLM generally adopts. The state specifies the minimum distance from lease lines or government survey lines for the bottom hole location of the well bore depending upon depth of the well. The spacing regulations determine the acres assigned to each well. Spacing unit size is established to provide for the most efficient and economic recovery of oil or gas from a reservoir. Normal well spacing ranges from 40 acres to 640 acres (**Figures A-2 and A-3**). Wells deeper than 11,000 feet can be no closer than 1,650 feet to other producing wells below 11,000 feet. Only one producing well per formation is allowed in each 40, 80, 160, 320, and 640-acre unit.

Drilling of Development Wells

The procedures used in drilling development wells are the same as those used for wildcat wells, but usually with less subsurface sampling, testing, and evaluation. The rate at which development wells are drilled in a field depends on factors such as whether the field is developed on a lease basis or unitized basis, the probability of profitable production, the availability of drilling equipment, lease requirements, and the degree to which limits of the field are known. Some fields go through several development phases, the first resulting from the original discovery and others from later discovery. A field can be considered fully developed and produce for several years, and then a well may be drilled to a deeper or shallower pay zone. Discovery of a new

pay zone in an existing field is a “pool” discovery (as distinguished from a new field discovery). A pool discovery may lead to the drilling of additional wells, often from the same drilling pad as existing wells.

Inspections

Geophysical operations and lease operations are inspected to determine compliance with approved permits, to resolve conflicts or correct problems and to determine effectiveness and need of lease stipulations. All inspections are documented. Operators are required to correct problems or violations.

Surface Requirements

Field development activities that cause surface disturbance include access roads, well sites, production facility sites, flow line and utility line routes and waste disposal sites. Surface uses in a gas field will be less than in an oil field, because gas wells are usually drilled on larger spacing units. The spacing pattern of 640 acres per well, which is common in gas fields, will require only one well per section and might require only 1/2 mile of access roads and pipelines. Production facilities include separation and storage equipment. Separation equipment is required when production includes a combination of oil, gas, or water and storage equipment is required for holding liquids prior to sales.

Flow Lines

Oil and gas are transferred from the well to storage facilities through small diameter (<6 inches) flow lines. Flow lines can be on the surface, buried or elevated. Produced water, gas, or polymerized liquid is transferred from storage facilities to injection wells for secondary recovery.

Separating, Treating, and Storage

Any water or gas associated with produced oil is separated from the oil before it is placed in storage tanks. The treating facilities are located at a storage tank battery. Low-pressure petroleum that must be pumped from the well is treated in a single separation. High-pressure, flowing petroleum can require several stages or separation, with a pressure reduction accompanying each stage.

Produced gas is sold when there is sufficient volume, necessary transportation, a market, and it is economical. Generally, if the volume of produced gas is too low for sales, it is used as fuel for well pump engines and heating fuel for the treaters. If the volume of produced gas exceeds fuel requirements on the lease but gas sales are not possible, the gas can be flared or vented into the atmosphere when authorized by permit in accordance with state and federal regulations. When water is produced with the hydrocarbons, it is separated before the gas is removed. In primary operations, where natural pressures or gravity causes the petroleum in the reservoir to flow to the wellbores, the degree of mixing is high

enough to require chemical and heat treatment to separate the oil and water. In secondary production, where water injection or other methods are used to force additional petroleum to the wellbore, the oil and water often are not highly emulsified. In this case, the oil and water can be separated by gravity in a tall settling tank. Produced water can be disposed of by injection into the subsurface, surface evaporation or beneficial purposes such as water for livestock or irrigation.

Produced water from oil and gas operations is normally disposed of by subsurface injection or in surface pits. Regardless of the method of disposal, it must be acceptable to the BLM, in accordance with the requirements of Onshore Oil and Gas Order No. 7, titled “Disposal of Produced Water.” Disposal of produced water by injection wells requires permits from the Montana Board of Oil and Gas Conservation. When produced water is disposed underground, it is introduced or injected under pressure into a subsurface horizon containing water of equal or poorer quality. Produced water may be injected into the producing zone from which it originated to stimulate oil production. Dry holes or depleted wells are commonly converted for saltwater disposal and occasionally new wells are drilled for this purpose. The law and regulations require that all injection wells be permitted under the Underground Injection Control program.

Under the Underground Injection Control approval process, the disposal well must be pressure tested to ensure the integrity of the casing. The disposal zone must also be isolated by use of tubing and mechanical plug called a packer. The packer seals off the inside of the casing and only allows the injected water to enter the disposal zone. The tubing and packer are also pressure tested to ensure their integrity. These pressure tests confirm isolation of the disposal zone from possible usable water zones. The oil is transported to storage tanks through flow lines after separation from any water or gas. Storage tanks are usually located on the lease either at the producing well or at a central production facility. The number and size of tanks are dependent upon the type and amount of production on the lease.

ABANDONMENT

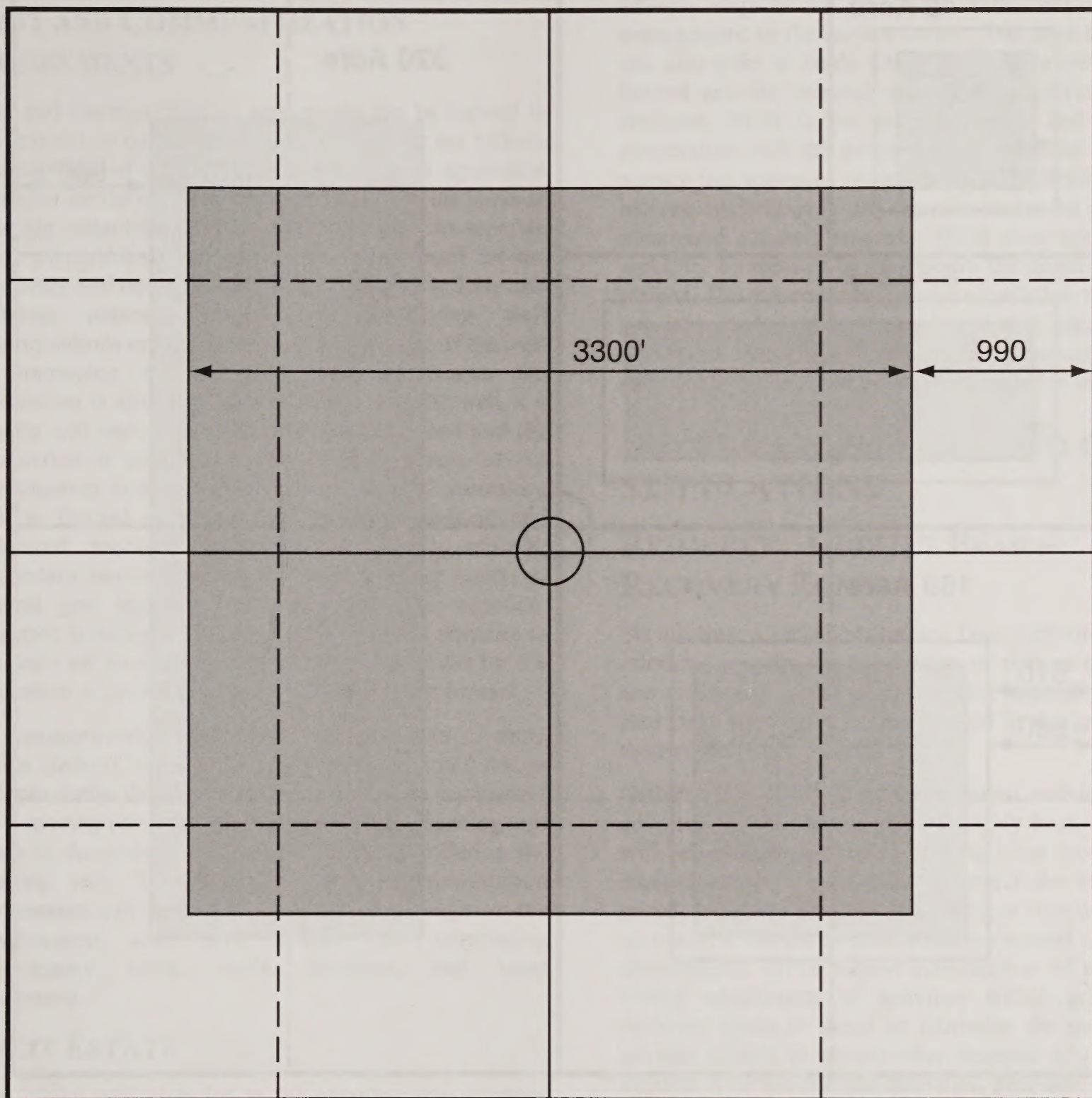
When drilling wells are unsuccessful or production wells are no longer useful, the well is plugged, equipment is removed from the well site or production facility site, and the site is abandoned. The well bore is secured by placing cement plugs to isolate hydrocarbon-producing formations from contaminating other mineral or water bearing formations. The site and roads are then restored as near as possible to original contours. Topsoil is replaced and the recontoured areas are seeded. Reclamation of access roads and well sites on privately owned surface is completed according to the surface owner's requirements.

Rehabilitation requirements generally are made a part of the Application for Permit to Drill. Upon completion of abandonment and rehabilitation operations, the lessee or operator notifies the Great Falls Oil and Gas Field Station that the location is ready for inspection. Final abandonment will not be approved until the required surface reclamation work has been completed to the satisfaction of the BLM or surface owner. The period of bond liability for the well site is terminated after

approval of final abandonment. Reclamation of the reserve pit is part of the well site reclamation process. Reserve pit reclamation includes removal of fluids to a disposal well or commercial pit and burial of solids in the pit. Solids should not be buried until dry and then covered with a minimum of 6 feet of native soil. Any pit liner may be buried in place. Methods such as solidification or dewatering may be used to help dry the solids.

Figure A-2. Gas Well Spacing

640 Acre Spacing



SOURCE: Montana Oil & Gas Commission



Area in which well should be drilled

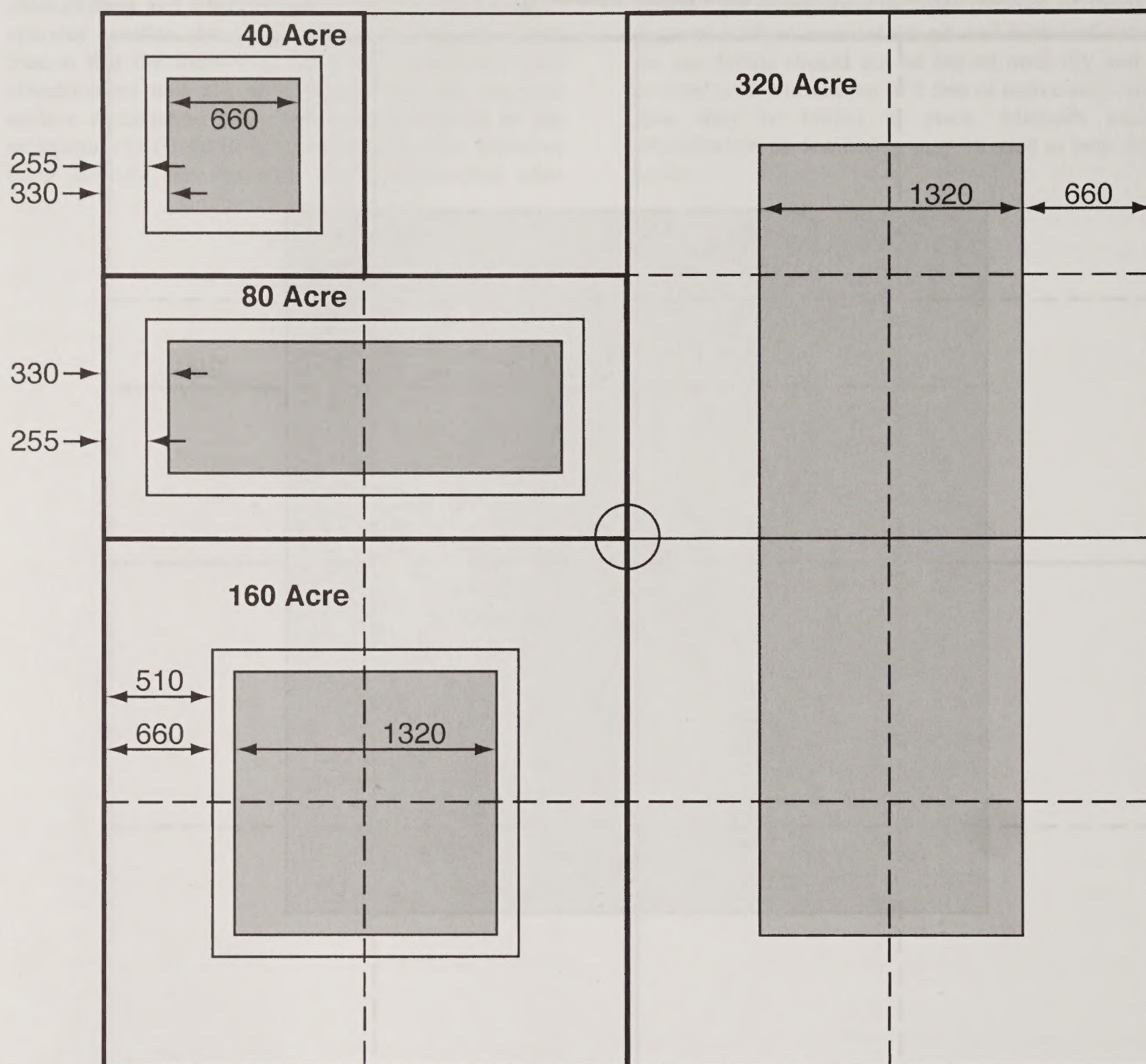
Well
Depth
(feet)

0>

Minimum Well
Distance
(feet)

990

Figure A-3. Oil Well Spacing



SOURCE: Montana Oil & Gas Commission



Area in which well should be drilled

Well Depth (feet)	Spacing (acre)	Nearest Boundary (feet)	Topographic Tolerance (feet)	Minimum Well Distance (feet)
0-6,000	40 & 80	330	75	255
6,000 - 11,000	160	660	150	510
11,001 - >	320	660	none	none

For the 320 acre spacing (1,650 well tolerance) and the 80 acre spacing the drilling unit will be delineated either N-S or E-W

REGULATIONS, LAWS, AND SPECIAL PROCEDURES

UNIT AND COMMUNITIZATION AGREEMENTS

Unit and communitization agreements can be formed in the interest of conservation and to allow for the orderly development of oil and gas reserves. A unit agreement provides for the recovery of oil and gas from the lands as a single consolidated entity without regard to separate lease ownerships. An exploratory unit is used for the discovery and development of the field in an orderly and efficient manner. Paying and nonpaying well determinations are made for each well drilled. If the well is nonpaying as defined by the agreement, the production is allocated on a lease basis. If the well is a paying unit well, a participating area is formed and the production is allocated to all interest owners in the participating area based on surface area. A secondary unit is formed after the field has been defined and enhanced recovery techniques are being utilized. Secondary recovery techniques include water injection, natural gas injection, or carbon dioxide injection. Injection is initiated to maintain the reservoir pressure to maintain oil production. The agreement provides for the allocation of production among all the interest owners.

A communitization agreement combines two or more leases (federal, state, or fee) that otherwise could not be independently developed in conformity with established well spacing patterns. The leases within the spacing unit share in the costs and benefits of the well drilled in the spacing unit. Therefore, unit and communitization agreements can lessen the amount of damage to the environment and save dollars by eliminating unnecessary wells, roads, pipelines, and lease equipment.

SPLIT ESTATE

Part of the area included in the planning area contains lands known as split estate lands. These are lands where the surface ownership is different from the mineral ownership. Management of federal oil and gas resources on these lands is somewhat different from management on lands where both surface and mineral ownership is federal. On split estate lands where the surface ownership is private, the BLM places necessary restrictions and requirements on its leases and permit approvals and works in cooperation with the surface owner. BLM has established policies for the management of federal oil and gas resources in accordance with federal laws and regulations.

The BLM does not have the legal authority to regulate how private surface is managed. BLM does have the statutory authority to require measures by lessees to avoid or minimize adverse impacts that may result from federally authorized mineral lease activities. These

measures, in the form of lease stipulations or permit conditions of approval, are intended to protect or preserve the privately owned resources and prevent adverse impacts to adjoining lands, not to dictate management to the surface owner. The term split estate can also refer to lands where the surface ownership is federal and the mineral ownership is private. In this situation, BLM is the surface owner, and works in cooperation with the proponent and the state regulatory agency that approves private mineral applications. BLM has responsibilities in this situation under the previously mentioned statutes; however, BLM does not have the authority to approve or disapprove the mineral owner's actions. The mineral estate owner usually has the right to enter the land and use the surface that is necessary and reasonable for mineral development through either a reserved or an outstanding right contained in the deed.

ALTERNATIVE A OIL AND GAS STIPULATIONS

RESOURCE: GRIZZLY BEAR – RECOVERY ZONES

Stipulation: Controlled Surface Use. Activities may be relocated, require special design, or require on and off site mitigation measures to prevent impacts to grizzly bear populations and habitat located in the grizzly bear recovery zones.

Objective: 1) To ensure that proposed activities do not adversely affect the viability of grizzly bear, operations will be designed, including limiting noise levels and /or located so as to not adversely affect the viability of grizzly bear. 2) To restrict the timing or type of activities on roads, if needed to control human-animal conflicts or disturbances. 3) To require coordination of timing and timing adjustments of activities within grizzly bear recovery zones to avoid or minimize the potential for adverse effects to grizzly bear because of cumulative impacts from oil and gas activities, plus other activities within the area. This stipulation may limit the extent of field development.

Exception: An exemption may be granted if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: None.

Waiver: A waiver may be granted if new habitat studies in coordination with MFWP and the USFWS conclude that the area affected by this stipulation is not in grizzly bear occupied habitat.

RESOURCE: GRIZZLY BEAR – DENNING HABITAT (DISTRIBUTION ZONE)

Stipulation: Controlled Surface Use. Activities may be relocated, require special design, or require on and off site mitigation measures to prevent impacts to grizzly bear populations and habitat located in the grizzly bear distribution zone.

Objective: 1) To ensure that proposed activities do not adversely affect the viability of grizzly bear, operations will be designed, including limiting noise levels and /or located so as to not adversely affect the viability of grizzly bear. 2) To restrict the timing or type of activities on roads, if needed to control human-animal conflicts or disturbances. 3) To require coordination of timing and timing adjustments of activities within grizzly bear distribution zones to avoid or minimize the potential for adverse effects to grizzly bear because of cumulative impacts from oil and gas activities, plus other activities within the area. This stipulation may limit the extent of field development.

Exception: An exemption may be granted if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: None.

Waiver: A waiver may be granted if new habitat studies in coordination with MFWP and the USFWS conclude that the area affected by this stipulation is not in grizzly bear occupied habitat.

RESOURCE: GRAY WOLF – NORTHWEST MONTANA RECOVERY AREA ENDANGERED POPULATION

Stipulation: Controlled Surface Use. Activities may be relocated, require special design, or require on and off site mitigation measures to prevent impacts to gray wolf populations and habitat located in the gray wolf Northwest Montana Recovery Area.

Objective: 1) To ensure that proposed activities do not adversely affect the viability of gray wolf, operations will be designed, including limiting noise levels and /or located so as to not adversely affect the viability of gray wolf. 2) To restrict the timing or type of activities on roads, if needed to control human-animal conflicts or disturbances. 3) To require coordination of timing and timing adjustments of activities within the gray wolf Northwest Montana Recovery Area to avoid or minimize the potential for adverse effects to gray wolf because of cumulative impacts from oil and gas activities, plus other activities within the area. This stipulation may limit the extent of field development.

Exception: An exemption may be granted if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: None.

Waiver: A waiver may be granted if new habitat studies in coordination with MFWP and the USFWS conclude that the area affected by this stipulation is not in gray wolf occupied habitat.

RESOURCE: PRAIRIE DOG TOWNS

Stipulation: No Surface Occupancy. Activity is prohibited within the boundary of any prairie dog town or within ¼ mile of prairie dog towns.

Objective: To protect habitat for prairie dog towns.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting prairie dogs.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP and USFWS, determines that the entire leasehold no longer contains prairie dogs.

RESOURCE: SAGE GROUSE WINTER/SPRING RANGE

Stipulation: Timing Limitation. No activity from December 1 through May 15. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect sage grouse winter range from disturbance during the winter/spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer in consultation with Montana Fish, Wildlife and Parks (MFWP) and the U.S. Fish and Wildlife Service (USFWS), if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain sage grouse winter/spring range. The dates for the timing restriction may be modified if new information indicates that the

December 1 through May 15 dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer contains sage grouse winter/spring range, or if in coordination with MFWP and the USFWS, determines that the area is not critical for sage grouse.

RESOURCE: SAGE GROUSE STRUTTING GROUNDS (LEKS)

Stipulation: No Surface Occupancy. Activity is prohibited within 500' of sage grouse leks.

Objective: To protect sage grouse strutting grounds and leks to maintain regional sage grouse populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Waiver: The stipulation may be waived if the authorized officer, in consultation with MFWP and the USFWS, determines that the entire leasehold can be occupied without adversely affecting sage grouse leks.

RESOURCE: SAGE GROUSE BREEDING HABITAT

Stipulation: Timing Limitation. Activity is restricted from March 1 through June 30 in nesting and early brood rearing habitat (defined as within ¼ mile of leks).

This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect sage grouse leks and breeding habitat necessary for long-term maintenance of regional sage grouse populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP and the USFWS, determines that the entire leasehold can be

occupied without adversely affecting sage grouse leks or the surrounding breeding habitat.

RESOURCE: WILDLIFE MANAGEMENT AREAS

Stipulation: No Lease within the core area. The core area is considered to be any area approximately one mile or more inside the boundary. No Surface Occupancy is permitted in the perimeter area of the game ranges administered by MFWP. The perimeter area constitutes the area between the boundary of the game range extending approximately one mile into the interior of the game range.

Objective: To protect MFWP elk winter range necessary for long-term maintenance of regional elk populations and other wildlife values.

Exception: An exception to this stipulation may be granted by the authorized officer if, in coordination with MFWP, it is determined that portions of the game range can be occupied without adversely affecting elk winter range use or other wildlife values.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in coordination with MFWP determines that portions of the game range can be occupied without adversely affecting elk winter range use or other wildlife values.

Waiver: None.

RESOURCE: BIG GAME WINTER/SPRING RANGE

Stipulation: Timing Limitation. No activity from December 1 through May 15 within winter range for wildlife. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect mule deer, elk, antelope, and moose winter/spring range from disturbance during the winter/ spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer in consultation with MFWP, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with MFWP, determines that portions of the area no longer contain wildlife winter/spring range. The dates for the timing restriction may be modified if new wildlife use information indicates that the December 1 through May 15 dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains winter/spring range for wildlife.

RESOURCE: ELK CALVING/BIG GAME BIRTHING AREAS

Stipulation: Timing Limitation. Activity is prohibited from May 1 through June 30 in big game birthing areas. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect mule deer, elk, antelope, and moose birthing areas from disturbance and facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contains birthing habitat for big game species. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains big game birthing areas.

RESOURCE: BIGHORN SHEEP YEARLONG RANGE

Stipulation: Timing Limitation. Activity is prohibited from December 1 through May 15 in bighorn rutting, winter and lambing habitat. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect bighorn rutting, winter and lambing habitat from disturbance and facilitate long-term maintenance of bighorn sheep populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain rutting, winter, and lambing habitat for bighorn sheep. The dates

for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains bighorn sheep rutting, winter or lambing areas.

RESOURCE: BIGHORN SHEEP CORE AREAS

Stipulation: Timing Limitation. Activity is prohibited from December 1 through May 15 in bighorn sheep core habitat. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect bighorn sheep yearlong habitat necessary for long-term maintenance of bighorn sheep populations.

Exception: An exception to this stipulation may be granted by the authorized officer, in consultation with MFWP, if the operator submits a plan which demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with MFWP, determines that portions of the bighorn sheep core areas can be occupied without adversely affecting bighorn sheep use.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold can be occupied without adversely affecting bighorn sheep use in the core areas.

RESOURCE: BALD EAGLE NEST SITES/BREEDING HABITAT

Stipulation: No Surface Occupancy. Activity is prohibited within 1/2 mile of bald eagle nest sites and within bald eagle nesting habitat in riparian areas.

Objective: To protect bald eagle nesting sites and/or breeding habitat in accordance with the Endangered Species Act and the Montana Bald Eagle Management Plan.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bald eagle or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with the USFWS.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with USFWS, determines that the area can be occupied without adversely affecting bald eagle nest sites or nesting habitats.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest sites or nesting habitat.

RESOURCE: BALD EAGLE NEST SITES/BREEDING HABITAT

Stipulation: Timing Limitation. No activity is allowed from February 1 through August 31 in a one mile radius around bald eagle nest sites. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect bald eagle nesting site and/or breeding habitat in accordance with the Endangered Species Act and the Montana Bald Eagle Management Plan.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bald eagle or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with the USFWS.

Modification: A modification may be granted if new habitat studies show that a portion of the area is not used by eagles.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest sites or nesting habitat.

RESOURCE: RAPTOR BREEDING TERRITORIES (GOLDEN EAGLE, PRAIRIE FALCON, SWAINSON'S HAWK)

Stipulation: No Surface Occupancy. Activity is prohibited within ¼ mile of raptor nest sites which have been active within the past five years. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect reproductive potential of breeding habitat for special status raptors.

Exception: An exception to this stipulation may be granted by the authorized officer of the operator submits a plan that demonstrates the impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer are within 1/2 mile of raptor nest sites. The dates for the timing restriction may be modified if new information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer is within 1/2 mile of nest sites.

RESOURCE: PEREGRINE FALCON NEST SITES/BREEDING HABITAT

Stipulation: No Surface Occupancy. Activity is prohibited within ¼ mile of peregrine falcon nest sites.

Objective: To protect peregrine falcon nesting sites and/or breeding habitat.

Exception: An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that the proposed action will not affect the peregrine falcon or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with USFWS.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with USFWS, determines that portions of the area can be occupied without adversely affecting peregrine falcon nest sites or breeding habitat.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting peregrine falcon nest sites or breeding habitat.

RESOURCE: FERRUGINOUS HAWK BREEDING TERRITORIES

Stipulation: No Surface Occupancy. Activity is prohibited within ¼ mile of ferruginous hawk nest sites that have been active within the past 5 years. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To maintain the reproductive potential of ferruginous hawk nest sites.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrated that the impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting the production potential of ferruginous hawk nest sites.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold can be occupied without adversely affecting the production potential of ferruginous hawk nest sites.

RESOURCE: THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Stipulation: Controlled Surface Use. The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Objective: Avoid BLM-approved activity that will contribute to a need to list a species or their habitat as threatened or endangered.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: WESTSLOPE CUTTHROAT TROUT HABITAT (90-99% PURE)

Stipulation: No Surface Occupancy. No activity allowed within 1/4 mile from centerline of stream containing known populations of 90-99% genetically pure westslope cutthroat trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Upper Missouri River and Columbia River Basins Westslope Cutthroat Trout.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP determines the stream is no longer considered important to the viability of the species.

RESOURCE: FLUVIAL AND ADFLUVIAL ARCTIC GRAYLING HABITAT

Stipulation: No Surface Occupancy. No activity allowed within 1/4 mile from centerline of streams containing known populations of Arctic grayling.

Objective: To ensure healthy aquatic habitat exists along rivers and tributaries important to the viability of fluvial and adfluvial Arctic grayling.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive Arctic grayling populations. The following mitigation measures would apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality or quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: BULL TROUT

Stipulation: Controlled Surface Use. Activities may be relocated, require special design, or require on and off site mitigation measures to prevent impacts to bull trout populations.

Objective: 1) To ensure that proposed activities do not adversely affect the viability of bull trout, operations will be designed and/or located so as to not adversely affect the viability of bull trout. 2) To restrict the timing or type of activities on roads, if needed to control sediment delivery to streams. 3) To require coordination or adjustments of activities within bull trout habitat to avoid or minimize the potential for adverse effects to bull trout because of cumulative impacts from oil and gas activities, plus other activities within the area. This stipulation may limit the extent of field development.

Exception: An exemption may be granted if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: None.

Waiver: A waiver may be granted if new habitat studies in coordination with the USFWS conclude that the area affected by this stipulation is not in bull trout occupied habitat.

RESOURCE: YELLOWSTONE CUTTHROAT

Stipulation: No Surface Occupancy. No activity allowed within ¼ mile from centerline of streams containing known populations of genetically pure Yellowstone cutthroat trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Yellowstone Cutthroat.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. The following mitigation measures would apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: CLASS 1 FISHERIES

Stipulation: No Surface Occupancy. No activity allowed within 1000' from centerline of Class 1 fishery streams (Blue Ribbon trout streams).

Objective: To ensure healthy aquatic habitat are maintained along Class 1 fisheries.

Exception: An exception may be granted if MFWP modify the Class 1 fisheries rating. Application of the following mitigation measures apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: None.

RESOURCE: DEVELOPED RECREATION SITES

Stipulation: No Surface Occupancy. Activity is prohibited within 300 feet of developed recreation sites.

Currently there are 49 developed recreation sites: Beartooth Landing Rec Site, Bryant Creek Rec Site, Buffalo Hump Rec Site, Carbella Rec Site, Clark's Bay Rec Site, Crimson Bluff Rec Site, Crow Creek Rec Site, Departure Point Rec Site, Devil's Elbow Rec Site, Dickie Bridge Rec Site, Divide Bridge Campground, Divide Bridge Day Use, East Bank Rec Site, Four Corners OHV Trailhead, French Bar Rec Site, Galena Gulch Rec Site, Headlane Trailhead, Holter Lake Dam Rec Site, Holter Lake Rec Site, Jerry Creek Br Fishing Access, John G Mine Trailhead, Log Gulch Rec Site, Lombard Historical, Lower Toston Rec Site, Maiden Rock East, McMaster Hill East Trailhead, McMaster Hill West Trailhead, Moose Creek Trailhead, Ohio Gulch OHV Trailhead, Pintlar Creek Rec Site, Pipestone OHV Rec Site, Radersburg OHV Trailhead, Ringing Rocks Rec Site, Sawlog Creek Rec Site, Sawmill Gulch Trailhead, Sheep Camp Rec Site, Sheep Mountain Trailhead, Sleeping Giant Trailhead, Spokane Bay Rec Site, Spokane Bay Trailhead, Spokane Hills South, Titan Gulch Rec Site, Toston Dam Rec Site, Tumbleweed Lane Trailhead, Two Camps Vista, Ward Ranch Historical Site, Whiskey Gulch Trailhead, White Sandy Campground, Woodsiding Trailhead

Objective: To recognize and protect the public's opportunity for quality recreation experiences at those sites developed for that purpose. A 300-foot buffer would protect capital investment, and to a limited extent, visitors' recreation experiences while at the site.

Exception: An exception may be granted by the authorized officer if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be mitigated.

Modification: The boundaries of the area may be modified by the authorized officer if the recreation area boundaries are changed.

Waiver: This stipulation may be waived by the authorized officer if the entire leasehold no longer contains a developed recreation area.

RESOURCE: CULTURAL AND PALEONTOLOGICAL RESOURCES

Stipulation: Controlled Surface Use. An inventory of the leased lands may be required prior to surface disturbance to determine if cultural resources or paleontological localities are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

- 1) Contact the Surface Management Agency (SMA) to determine if a cultural or paleontological resource inventory is required. If an inventory is required, then;
- 2) The SMA will complete the required inventory; or the lessee or operator, at their option, may engage

the services of a cultural resource consultant acceptable to the SMA to conduct an inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the planned disturbance to cover possible site relocation, or for planning purposes.

- 3) Implement mitigation measures required by the SMA. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and/or extensive recordation.

The lessee or operator is required to bring to the attention of the field office manager any cultural resources or other objects of scientific interest discovered as a result of approved operations under the lease, and shall leave all discoveries intact and undisturbed until directed to proceed by the field office manager (16 U.S.C. 470).

Objective: Compliance with Section 106 of the National Historic Preservation Act is required for all actions which may affect cultural resources eligible for nomination to the National Register of Historic Places. Section 6 of the Oil and Gas Lease Terms (Form 3100-11) requires that operations be conducted in a manner that minimizes adverse impacts to cultural and other resources.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: VRM CLASS II, III, & IV AREAS

Stipulation: Controlled Surface Use. All surface disturbing activities and construction of semi-permanent and permanent facilities may require special design including location, painting, and camouflage to blend with the natural surroundings and meet the visual quality objectives for each respective class.

Objective: To control the visual impacts of activities and facilities within acceptable levels.

Exception: None

Modification: None

Waiver: None

RESOURCE: WETLANDS, FLOODPLAINS, RIPARIAN AREAS, AND WATER QUALITY

Stipulation: No Surface Occupancy. Activity is prohibited within 500 feet of reservoirs, lakes, ponds, and intermittent, ephemeral, or small perennial streams, and within 1000 feet of perennial streams and rivers.

Objective: To protect biological and hydrological features associated with wetlands, floodplains, and riparian areas.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area do not include wetlands, floodplains, or riparian areas.

Waiver: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold does not include wetlands, floodplains, or riparian areas.

RESOURCE: SPECIAL STATUS PLANT HABITATS

Stipulation: Controlled Surface Use. A field inspection will be conducted for special status plant species by the lessee prior to any surface disturbance. A list of special status plant species will be provided to the lessee at the time of the lease. Plant Species on the list are subject to change over time as new information becomes available. Plant inventories must be conducted at a time of year when the target species are identifiable. A report must be provided to the BLM documenting the presence or absence of special status plants in the area proposed for surface disturbance. The findings of this report may result in restrictions to the operator's plans or may preclude use and occupancy.

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: An exception may be granted if BLM determines that the portion of the lease identified for surface disturbing activities does not support special status plant species or provide potential habitat for these species.

Modification: The boundaries of the area to be inventoried for special status plants may be modified if BLM determines that a large portion of the lease identified for surface disturbing activities doesn't support special status plant species or provide potential habitat for these species.

Waiver: The field inspection and plant inventory may be waived by the authorized if he/she determines that the subject lease occurs in an area with no known populations of special status plant species and that the area doesn't provide habitat for those species.

RESOURCE: KNOWN OR DISCOVERED SPECIAL STATUS PLANTS OR POPULATIONS

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within 1/4 mile of special status plant species

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: None.

Modification: The boundaries of the no surface occupancy area may be modified if BLM determines that land within 1/4 mile of the special status plant population does not provide potential habitat for these species.

Waiver: None.

RESOURCE: SLOPES >30% ON NON- BOULDER BATHOLITH SOILS OR SLOPES >20% ON BOULDER BATHOLITH SOILS

Stipulation: Controlled Surface Use. Prior to surface disturbance on slopes greater than 30 percent on non-Boulder Batholith soils or 20 percent on Boulder Batholith soils, an engineering/reclamation plan must be approved by the authorized officer. Such plan must demonstrate how the following will be accomplished:

- Site productivity will be restored.
- Surface runoff will be adequately controlled.
- Off-site areas will be protected from accelerated soil erosion.
- Surface disturbing activities will not be conducted during extended wet periods.

Objective: To maintain soil productivity and provide necessary protection to prevent excessive soil erosion on steep slopes.

Exception: An exception may be granted if the operator can demonstrate in a plan of operations that adverse effects can be minimized and activities safely conducted.

Modification: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of area do not include slopes over 30 percent on non-Boulder Batholith soils or 20 percent on Boulder Batholith, or the operator can demonstrate in a plan of operations that adverse effects can be minimized.

Waiver: This stipulation may be waived by the authorized officer if it is determined that none of the leasehold contains slopes greater than 30 percent on non-Boulder Batholith soils or 20 percent on Boulder Batholith soils.

RESOURCE: CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL (MARYSVILLE)

Stipulation: No Surface Occupancy. Activity is prohibited within 300 feet of designated Continental Divide National Scenic Trail.

Objective: To preserve and protect the existing scenic character of the landscape along the trail.

Exception: No exceptions will be granted.

Modification: No modifications will be granted.

Waiver: No waivers will be granted.

ALTERNATIVE B OIL AND GAS STIPULATIONS

RESOURCE: GRIZZLY BEAR – RECOVERY ZONES

Stipulation: No Surface Occupancy. Activity is prohibited within the boundary of the Recovery Zone for Grizzly Bears.

Objective: To preclude surface disturbing activities in the Grizzly Bear Recovery Zone.

Exception: An exception will not be granted while the area is important to grizzly bear recovery or to its conservation following a change in legal status under the Endangered Species Act. Conditions for Exception require that the area is no longer classified as necessary for the recovery of the species.

Modification: This stipulation may be modified if a portion of the area is no longer important to grizzly bear recovery or to its conservation following a change in legal status under the Endangered Species Act. Conditions for Modification require that a portion of the area is no longer classified as necessary for the recovery of the species and is not considered important to its conservation.

Waiver: This stipulation will not be waived while the area is important to grizzly bear recovery or to its conservation following a change in legal status under the Endangered Species Act. Conditions for Waiver require that the area is no longer classified as necessary for the recovery or conservation of the species.

RESOURCE: GRIZZLY BEAR DENNING HABITAT (DISTRIBUTION ZONE)

Stipulation: Timing Limitation. Activity is prohibited from April 1 to June 30 and from September 15 – October 15 in the Grizzly Bear Distribution Zone.

Objective: To preclude surface disturbing activities in grizzly bear denning areas which could cause increased

stress and/or displacement of animals during critical time periods (April 1 - June 30 and September 15 - October 15).

Exception: An exception may be granted if it is determined that the animals have moved out of and are not using the general area during the particular year.

Modification: A modification of the stipulation may be granted if new habitat studies show that a portion of the area is not used by grizzly bear for denning.

Waiver: A waiver may be granted if new habitat studies in coordination with the Fish and Wildlife Service conclude that the area affected by this stipulation is not critical for grizzly bear denning.

RESOURCE: GRAY WOLF - NORTHWEST MONTANA RECOVERY AREA ENDANGERED POPULATION

Stipulation: Timing Limitation. Activity is prohibited within a 1 mile buffer around wolf dens or rendezvous sites from April 15 to June 30 in the Northwest Montana Recovery Area. This stipulation would be applied to the Northwest Montana Recovery Area (97,847 acres) but there are no known den or rendezvous sites currently mapped in this area.

Objective: To preclude surface disturbing activities in wolf denning or rendezvous areas in the Northwest Montana Recovery Area which could cause increased stress and/or displacement of animals during the critical time period (April 15 - June 30).

Exception: An exception may be granted if it is determined that the animals have moved out of and are not using the general area during the particular year.

Modification: A modification of the stipulation may be granted if new habitat studies show that a portion of the area is not used by wolves for denning or for rendezvous sites.

Waiver: A waiver may be granted if new habitat studies in coordination with the Fish and Wildlife Service conclude that the area affected by this stipulation is not critical for wolf denning or for rendezvous sites.

RESOURCE: PRAIRIE DOG TOWNS

Stipulation: No Surface Occupancy. Activity is prohibited within the boundary of any prairie dog town.

Objective: To protect habitat for prairie dog towns.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines

that portions of the area can be occupied without adversely affecting prairie dogs.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP and USFWS, determines that the entire leasehold no longer contains prairie dogs.

RESOURCE: SAGE GROUSE WINTER/SPRING RANGE

Stipulation: Timing Limitation. No activity from December 1 through May 15 within winter and spring range for sage grouse. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect sage grouse winter range from disturbance during the winter/spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer in consultation with MFWP and the USFWS, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain sage grouse winter/spring range. The dates for the timing restriction may be modified if new information indicates that the December 1 through May 15 dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer contains sage grouse winter/spring range, or if in coordination with MFWP and the USFWS, determines that the area is not critical for sage grouse.

RESOURCE: SAGE GROUSE STRUTTING GROUNDS (LEKS)

Stipulation: No Surface Occupancy. Activity is prohibited within 1/4 mile of sage grouse leks.

Objective: To protect sage grouse strutting grounds and leks to maintain regional sage grouse populations.

Exception: An exception to this stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Waiver: The stipulation may be waived if the authorized officer, in consultation with MFWP,

determines that the entire leasehold can be occupied without adversely affecting sage grouse leks.

RESOURCE: SAGE GROUSE BREEDING HABITAT

Stipulation: Timing Limitation. Activity is restricted from March 1 through June 30 in nesting and early brood rearing habitat (defined as within three miles of leks). This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect sage grouse leks and breeding habitat necessary for long-term maintenance of regional sage grouse populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP and the USFWS, determines that the entire leasehold can be occupied without adversely affecting sage grouse leks or the surrounding breeding habitat.

RESOURCE: WILDLIFE MANAGEMENT AREAS

Stipulation: No Surface Occupancy. Activity is prohibited within the boundary of Wildlife Management Areas administered by Montana Department of Fish, Wildlife, and Parks (MFWP).

Objective: To protect MFWP elk winter range necessary for long-term maintenance of regional elk populations and other wildlife values.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: BIG GAME WINTER/SPRING RANGE

Stipulation: Timing Limitation. No activity from December 1 through May 15 within winter range for wildlife. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect mule deer, elk, antelope, and moose winter/spring range from disturbance during the winter/spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer in consultation with MFWP, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with MFWP, determines that portions of the area no longer contain wildlife winter/spring range. The dates for the timing restriction may be modified if new wildlife use information indicates that the December 1 through May 15 dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains winter/spring range for wildlife.

RESOURCE: ELK CALVING/BIG GAME BIRTHING AREAS

Stipulation: Timing Limitation. Activity is prohibited from April 1 through June 30 in big game birthing areas. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect mule deer, elk, antelope, and moose birthing areas from disturbance and facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain birthing habitat for big game species. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains big game birthing areas.

RESOURCE: BIGHORN SHEEP YEARLONG RANGE

Stipulation: Timing Limitation. Activity is prohibited from November 1 through June 30 in bighorn rutting, winter and lambing habitat. This stipulation does not

apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect bighorn rutting, winter and lambing habitat from disturbance and facilitate long-term maintenance of bighorn sheep populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain rutting, winter, and lambing habitat for bighorn sheep. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains bighorn sheep rutting, winter or lambing areas.

RESOURCE: BIGHORN SHEEP CORE AREAS

Stipulation: No Surface Occupancy. Activity is prohibited within the bighorn sheep core areas.

Objective: To protect bighorn sheep yearlong habitat necessary for long-term maintenance of bighorn sheep populations.

Exception: An exception to this stipulation may be granted by the authorized officer, in consultation with MFWP, if the operator submits a plan which demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with MFWP, determines that portions of the bighorn sheep core areas can be occupied without adversely affecting bighorn sheep use.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold can be occupied without adversely affecting bighorn sheep core areas.

RESOURCE: BALD EAGLE NEST SITES/BREEDING HABITAT

Stipulation: No Surface Occupancy. Activity is prohibited within 1/2 mile of bald eagle nest sites and within bald eagle nesting habitat in riparian areas.

Objective: To protect bald eagle nesting sites and/or breeding habitat in accordance with the Endangered

Species Act and the Montana Bald Eagle Management Plan.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bald eagle or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with the USFWS.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with USFWS, determines that the area can be occupied without adversely affecting bald eagle nest sites or nesting habitats.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest sites or nesting habitat.

RESOURCE: BALD EAGLE NEST SITES/BREEDING HABITAT

Stipulation: Timing Limitation. No activity is allowed from February 1 through August 31 in a one mile radius around bald eagle nest sites. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect bald eagle nesting site and/or breeding habitat in accordance with the Endangered Species Act and the Montana Bald Eagle Management Plan.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bald eagle or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with the USFWS.

Modification: A modification may be granted if new habitat studies show that a portion of the area is not used by eagles.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest sites or nesting habitat.

RESOURCE: RAPTOR BREEDING TERRITORIES (GOLDEN EAGLE, PRAIRIE FALCON, SWAINSON'S HAWK)

Stipulation: Timing Limitation. No activity from March 1 through July 31, within 1/2 mile of raptor nest sites which have been active within the past five years. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect reproductive potential of breeding habitat for special status raptors.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates the impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer are within 1/2 mile of raptor nest sites. The dates for the timing restriction may be modified if new information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer is within 1/2 mile of nest sites.

RESOURCE: PEREGRINE FALCON NEST SITES/BREEDING HABITAT

Stipulation: No Surface Occupancy. Activity is prohibited within one mile of peregrine falcon nest sites.

Objective: To protect peregrine falcon nesting sites and/or breeding habitat.

Exception: An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that the proposed action will not affect the peregrine falcon or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with USFWS.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with USFWS, determines that portions of the area can be occupied without adversely affecting peregrine falcon nest sites or breeding habitat.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting peregrine falcon nest sites or breeding habitat.

RESOURCE: FERRUGINOUS HAWK BREEDING TERRITORIES

Stipulation: No Surface Occupancy. Activity is prohibited within 1/2 mile of ferruginous hawk nest sites that have been active within the past 5 years.

Objective: To maintain the reproductive potential of ferruginous hawk nest sites.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrated that the impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting the production potential of ferruginous hawk nest sites.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold can be occupied without adversely affecting the production potential of ferruginous hawk nest sites.

RESOURCE: THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Stipulation: Controlled Surface Use. The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Objective: Avoid BLM-approved activity that will contribute to a need to list a species or their habitat as threatened or endangered.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: WESTSLOPE CUTTHROAT TROUT HABITAT (90-99% PURE)

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of stream containing known populations of 90-99% genetically pure westslope cutthroat trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Upper Missouri River and Columbia River Basins Westslope Cutthroat Trout.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP determines the stream is no longer considered important to the viability of the species.

RESOURCE: WESTSLOPE CUTTHROAT TROUT HABITAT (99-100% PURE)

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of stream containing known populations of 99-100% genetically pure westslope cutthroat trout.

Objective: To prevent sensitive aquatic habitat and trout populations from being impacted.

Exception: An exemption may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modifications: None

Waiver: A waiver may be granted if the MFWP determines the stream is no longer considered important to the viability of the species.

RESOURCE: FLUVIAL AND ADFLUVIAL ARCTIC GRAYLING HABITAT

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of stream containing known populations of Arctic grayling.

Objective: To ensure healthy aquatic habitat exists along rivers and tributaries important to the viability of fluvial and adfluvial Arctic grayling.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive Arctic grayling populations. The following mitigation measures would apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality or quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: BULL TROUT

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of streams containing known populations of bull trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of bull trout.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: YELLOWSTONE CUTTHROAT

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of streams containing known populations of genetically pure Yellowstone cutthroat trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Yellowstone Cutthroat.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. The following mitigation measures would apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: CLASS 1 FISHERIES

Stipulation: No Surface Occupancy. No activity allowed within ½ mile from centerline of Class 1 fishery streams (Blue Ribbon trout streams).

Objective: To ensure healthy aquatic habitat are maintained along Class 1 fisheries.

Exception: An exception may be granted if MFWP modifies the Class 1 fisheries rating. Application of the following mitigation measures apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: None.

RESOURCE: DEVELOPED RECREATION SITES

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within ¼ mile of developed recreation sites. Currently there are 49 developed recreation sites: Beartooth Landing Rec Site, Bryant Creek Rec Site, Buffalo Hump Rec Site, Carbella Rec Site, Clark's Bay Rec Site, Crimson Bluff Rec Site, Crow Creek Rec Site, Departure Point Rec Site, Devil's Elbow Rec Site, Dickie Bridge Rec Site, Divide Bridge Campground, Divide Bridge Day Use, East Bank Rec Site, Four Corners OHV Trailhead, French Bar Rec Site, Galena Gulch Rec Site, Headlane Trailhead, Holter Lake Dam Rec Site, Holter Lake Rec Site, Jerry Creek Br Fishing Access, John G Mine Trailhead, Log Gulch Rec Site, Lombard Historical, Lower Toston Rec Site, Maiden Rock East, McMaster Hill East Trailhead, McMaster Hill West Trailhead, Moose Creek Trailhead, Ohio Gulch OHV Trailhead, Pintlar Creek Rec Site, Pipestone OHV Rec Site, Radersburg OHV Trailhead, Ringing Rocks Rec Site, Sawlog Creek Rec Site, Sawmill Gulch Trailhead, Sheep Camp Rec Site, Sheep Mountain Trailhead, Sleeping Giant Trailhead, Spokane Bay Rec Site, Spokane Bay Trailhead, Spokane Hills South, Titan Gulch Rec Site, Toston Dam Rec Site, Tumbleweed Lane Trailhead, Two Camps Vista, Ward Ranch Historical Site, Whiskey Gulch Trailhead, White Sandy Campground, Woodsiding Trailhead

Objective: To recognize and protect the public's opportunity for quality recreation experiences at those sites developed for that purpose. Since BLM recreation

sites are generally developed to support the use of the surrounding lands, the one half mile buffer offers some protection for perpetuating those opportunities for which the site was developed, as well as protecting capital investments at the site.

Exception: An exception may be granted if a site is moved or eliminated.

Modification: The list of developed recreation sites may be modified if development is removed, or if a currently undeveloped site is developed in the future.

Waiver: A waiver may be granted if a site is moved or eliminated.

RESOURCE: SPECIAL RECREATION MANAGEMENT AREAS (SRMAs)

Stipulation: Controlled Surface Use. Operations within SRMAs must be conducted within a manner that minimizes encounters and conflicts with recreation users. Proposed activities may not alter or depreciate important recreational values located within the SRMA boundary. This would apply to the following Special Recreation Management Areas for this alternative: Holter Lake/Missouri River, Sleeping Giant, Hauser Lake/Lower Missouri River, Toston Reservoir/Missouri River, Scratchgravel Hills, Sheep Mountain, Pipestone, Upper Big Hole River, and Humbug Spires.

Objective: To prevent user conflicts and incompatible uses in areas with high recreational values and significant amounts of recreational activity.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating the impacts to recreation values and recreation users are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the authorized officer if the boundaries of the SRMA are changed.

Waiver: None.

RESOURCE: CULTURAL AND PALEONTOLOGICAL RESOURCES

Stipulation: Controlled Surface Use. An inventory of the leased lands may be required prior to surface disturbance to determine if cultural resources or paleontological localities are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

- 1) Contact the Surface Management Agency (SMA) to determine if a cultural or paleontological resource inventory is required. If an inventory is required, then:

- 2) The SMA will complete the required inventory; or the lessee or operator, at their option, may engage the services of a cultural resource consultant acceptable to the SMA to conduct an inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the planned disturbance to cover possible site relocation, or for planning purposes.
- 3) Implement mitigation measures required by the SMA. Mitigation may include relocation of proposed lease-related activities or other protective measures such as data recovery and/or extensive recordation.
- 4) The SMA will consult with Native American tribes as per IM 2005 – 003.

The lessee or operator is required to bring to the attention of the field office manager any cultural resources or other objects of scientific interest discovered as a result of approved operations under the lease, and shall leave all discoveries intact and undisturbed until directed to proceed by the field office manager (16 U.S.C. 470).

Objective: Compliance with Section 106 of the National Historic Preservation Act is required for all actions which may affect cultural resources eligible for nomination to the National Register of Historic Places. Section 6 of the Oil and Gas Lease Terms (Form 3100-11) requires that operations be conducted in a manner that minimizes adverse impacts to cultural and other resources.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: NATIONAL REGISTER OF HISTORIC PROPERTIES ELIGIBLE PROPERTIES/DISTRICTS

Stipulation: No Surface Occupancy: Activity is prohibited within 300 ft. of site boundaries and/or districts eligible for, or listed on the National Register of Historic Places. There is one known district, the Indian Creek Historic Mining District (134 acres).

Objective: To avoid disturbance to and protect, significant properties, districts, and their setting.

Exception: An exception to this stipulation may be granted by the authorized officer if the lessee or operator submits a plan which demonstrates that the adverse impacts to cultural properties can be mitigated through data recovery and/or extensive recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the Surface Management Agency, surface occupancy in that area must be prohibited.

Modification: No modification will be granted.

Waiver: No waiver will be granted.

RESOURCE: VRM CLASS II, III & IV AREAS

Stipulation: Controlled Surface Use. All surface disturbing activities and construction of semi-permanent and permanent facilities may require special design including location, painting, and camouflage to blend with the natural surroundings and meet the visual quality objectives for each respective class.

Objective: To control the visual impacts of activities and facilities within acceptable levels.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: WETLANDS, FLOODPLAINS, RIPARIAN AREAS, AND WATER QUALITY

Stipulation: No Surface Occupancy. Activity is prohibited within wetlands, floodplains, and riparian areas.

Objective: To maintain riparian/wetland functions and water quality.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: None.

Waiver: None.

RESOURCE: SPECIAL STATUS PLANT HABITATS

Stipulation: Controlled Surface Use. A field inspection will be conducted for special status plant species by the lessee prior to any surface disturbance. A list of special status plant species will be provided to the lessee at the time of the lease. Plant Species on the list are subject to change over time as new information becomes available. Plant inventories must be conducted at a time of year when the target species are identifiable. A report must be provided to the BLM documenting the presence or absence of special status plants in the area proposed for surface disturbance. The findings of this report may result in restrictions to the operator's plans or may preclude use and occupancy.

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: An exception may be granted if BLM determines that the portion of the lease identified for surface disturbing activities does not support special

status plant species or provide potential habitat for these species.

Modification: The boundaries of the area to be inventoried for special status plants may be modified if BLM determines that a large portion of the lease identified for surface disturbing activities doesn't support special status plant species or provide potential habitat for these species.

Waiver: The field inspection and plant inventory may be waived by the authorized if he/she determines that the subject lease occurs in an area with no known populations of special status plant species and that the area doesn't provide habitat for those species.

RESOURCE: KNOWN OR DISCOVERED SPECIAL STATUS PLANTS OR POPULATIONS

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within 1/4 mile of special status plant species

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: None.

Modification: The boundaries of the no surface occupancy area may be modified if BLM determines that land within 1/4 mile of the special status plant population does not provide potential habitat for these species.

Waiver: None.

RESOURCE: MUNICIPAL WATERSHEDS

Stipulation: No Surface Occupancy. Surface occupancy would be prohibited in the following municipal watersheds: Missouri River Siphon, Tenmile Creek Drainage, Big Hole River Intake, and Moulton Reservoir.

Objective: To protect drinking water for Municipalities within the Butte Field Office.

Exception: If the lessee can demonstrate that operations can occur on the lease without causing negative impacts to water quality at the intakes, an exception may be granted, if approved in writing by the authorized officer in consultation with the Field Office watershed specialist and the communities of Butte and Helena.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied and operations will not cause water quality at intakes to fail to meet drinking water standards established by Montana Department of Environmental Quality (MDEQ).

Waiver: None

RESOURCE: SLOPES >30% ON NON-BOULDER BATHOLITH SOILS OR SLOPES >20% ON BOULDER BATHOLITH SOILS

Stipulation: Controlled Surface Use. Prior to surface disturbance on slopes greater than 30 on non-Boulder Batholith soils or 20 percent on Boulder Batholith soils, an engineering/reclamation plan must be approved by the authorized officer. Such plan must demonstrate how the following will be accomplished:

- Site productivity will be restored.
- Surface runoff will be adequately controlled.
- Off-site areas will be protected from accelerated soil erosion.
- Surface disturbing activities will not conducted during wet periods.

Objective: To maintain soil productivity and provide necessary protection to prevent excessive soil erosion on steep slopes.

Exceptions: An exception may be granted if the operator can demonstrate in a plan of operations that adverse effects can be minimized and activities safely conducted.

Modifications: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of area do not include slopes over 30 percent on non-Boulder Batholith soils or 20 percent on Boulder Batholith, or the operator can demonstrate in a plan of operations that adverse effects can be minimized.

Waiver: This stipulation may be waived by the authorized officer if it is determined that none of the leasehold contains slopes greater than 30 percent on non-Boulder Batholith soils or 20 percent on Boulder Batholith soils.

RESOURCE: CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL (MARYSVILLE)

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within 1/2 mile of the Continental Divide National Scenic Trail.

Objective: To preserve and protect the existing scenic character of the landscape along the trail.

Exception: May be granted if this portion of the trail is relocated or if operator submits a plan that demonstrates that impacts to the area and the user experiences can be mitigated.

Modification: Modification may be granted should the trail be relocated or impacts of the action will not be noticed by users of the trail.

Waiver: May be granted if trail is moved from current location.

RESOURCE: DESIGNATED NATIONAL HISTORIC TRAILS – LEWIS AND CLARK TRAIL

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within 1/2 mile of designated National Historic Trail.

Objective: To preserve and protect designated National Historic Trails and the natural setting in which they occur.

Exception: No exceptions will be granted unless the operator demonstrates through a submitted plan that impacts to the area and its users can be mitigated.

Modification: No modifications will be granted unless impacts of the action will not be apparent to user along the trail.

Waiver: May be granted if impacts can be mitigated so that area values and user experiences are not negatively affected.

RESOURCE: RIVERS SUITABLE FOR WILD AND SCENIC RIVER DESIGNATION

Stipulation: No Surface Occupancy. Surface occupancy would be prohibited within 1/2 mile either side of the active river channel. This would apply to the following river segment lengths: 3.1 miles of the upper Missouri River and 2.6 miles of Muskrat Creek.

Objective: To protect river corridors and their Outstandingly Remarkable Values considered suitable for inclusion in the National Wild and Scenic Rivers system and the associated outstandingly remarkable values.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: RECREATION AND PUBLIC PURPOSES ACT LEASES AND PATENTS, AND 2920 AUTHORIZATIONS

Stipulation: No Surface Occupancy (NSO). Surface Occupancy and use is prohibited on Recreation & Public Purposes leases and patents and on leases and permits authorized under regulations found at 43 CFR 2920.

Objective: To protect developed facilities and commercial, recreational, and public uses and prevent incompatible uses on existing authorized areas.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated in coordination with the holder of the land use authorization.

Modification: The area affected by this stipulation may be modified by the authorized officer if land use authorization boundaries are modified.

Waiver: This stipulation may be waived by the authorized officer if land use authorization boundaries are modified.

ALTERNATIVE C OIL AND GAS STIPULATIONS

RESOURCE: GRIZZLY BEAR – RECOVERY ZONES

Stipulation: No Surface Occupancy. Activity is prohibited within the boundary of the Recovery Zone for grizzly bears.

Objective: To preclude surface disturbing activities in the Grizzly Bear Recovery Zone.

Exception: An exception will not be granted while the area is important to grizzly bear recovery or to its conservation following a change in legal status under the Endangered Species Act. Conditions for Exception require that the area is no longer classified as necessary for the recovery of the species.

Modification: This stipulation may be modified if a portion of the area is no longer important to grizzly bear recovery or to its conservation following a change in legal status under the Endangered Species Act. Conditions for Modification require that a portion of the area is no longer classified as necessary for the recovery of the species and is not considered important to its conservation.

Waiver: This stipulation will not be waived while the area is important to grizzly bear recovery or to its conservation following a change in legal status under the Endangered Species Act. Conditions for Waiver require that the area is no longer classified as necessary for the recovery or conservation of the species.

RESOURCE: GRIZZLY BEAR DENNING HABITAT (DISTRIBUTION ZONE)

Stipulation: No Surface Occupancy. Activity is prohibited in the boundary of the Distribution Zone for grizzly bears.

Objective: To preclude surface disturbing activities to denning habitat in the Grizzly Bear Distribution Zone.

Exception: An exception may be granted if it is determined that the animals have moved out of and are not using the general area during the particular year.

Modification: A modification of the stipulation may be granted if new habitat studies show that a portion of the area is not used by grizzly bear for denning.

Waiver: A waiver may be granted if new habitat studies in coordination with the Fish and Wildlife Service conclude that the area affected by this stipulation is not critical for grizzly bear denning.

RESOURCE: GRAY WOLF - NORTHWEST MONTANA RECOVERY AREA ENDANGERED POPULATION

Stipulation: No Surface Occupancy. Activity is prohibited within a 1 mile buffer around wolf dens or rendezvous sites in the Northwest Montana Recovery Area. This stipulation would be applied to the Northwest Montana Recovery Area (97,847 acres) but there are no known den or rendezvous sites currently mapped in this area.

Objective: To preclude surface disturbing activities in wolf denning or rendezvous areas in the Northwest Montana Recovery Area which could cause increased stress and/or displacement of animals.

Exception: An exception may be granted if it is determined that the animals have moved out of and are not using the general area during the particular year.

Modification: A modification of the stipulation may be granted if new habitat studies show that a portion of the area is not used by grizzly bear for denning.

Waiver: A waiver may be granted if new habitat studies in coordination with the Fish and Wildlife Service conclude that the area affected by this stipulation is not critical for grizzly bear denning.

RESOURCE: PRAIRIE DOG TOWNS

Stipulation: No lease within the boundary of any prairie dog town.

Objective: To protect habitat for prairie dog towns.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: SAGE GROUSE WINTER/SPRING RANGE

Stipulation: No Lease

Objective: To protect sage grouse winter range from disturbance during the winter/spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: None

Modification: None

Waiver: None

RESOURCE: SAGE GROUSE STRUTTING GROUNDS (LEKS)

Stipulation: No lease within 1/2 mile of sage grouse leks.

Objective: To protect sage grouse strutting grounds and leks to maintain regional sage grouse populations.

Exception: None

Modification: None

Waiver: None

RESOURCE: SAGE GROUSE BREEDING HABITAT

Stipulation: No Surface Occupancy. Surface occupancy land use is prohibited in sage grouse nesting and early-brook rearing habitat (defined as within 3 miles of leks).

Objective: To protect sage grouse leks and breeding habitat necessary for long-term maintenance of regional sage grouse populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP and the USFWS, determines that the entire leasehold can be occupied without adversely affecting sage grouse leks or the surrounding breeding habitat.

RESOURCE: WILDLIFE MANAGEMENT AREAS

Stipulation: No Lease

Objective: To protect MFWP elk winter range necessary for long-term maintenance of regional elk populations and other wildlife values.

Exception: None.

Modification: None.

Waiver: None.

**RESOURCE: BIG GAME
WINTER/SPRING RANGE**

Stipulation: No Lease

Objective: To protect mule deer, elk, antelope, and moose winter/spring range from disturbance during the winter/spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: None

Modification: None

Waiver: None

**RESOURCE: ELK CALVING/BIG GAME
BIRTHING AREAS**

Stipulation: No Lease

Objective: To protect mule deer, elk, antelope, and moose birthing areas from disturbance and facilitate long-term maintenance of wildlife populations.

Exception: None

Modification: None

Waiver: None

**RESOURCE: BIGHORN SHEEP
YEARLONG RANGE (INCLUDING CORE
AREAS)**

Stipulation: No Lease

Objective: To protect bighorn rutting, winter and lambing habitat from disturbance and facilitate long-term maintenance of bighorn sheep populations.

Exception: None

Modification: None

Waiver: None.

**RESOURCE: BALD EAGLE NEST
SITES/BREEDING HABITAT**

Stipulation: No Lease. No lease is allowed in a one mile radius around bald eagle nest sites.

Objective: To protect bald eagle nesting sites and/or breeding habitat in accordance with the Endangered Species Act and the Montana Bald Eagle Management Plan.

Exception: None

Modification: None.

Waiver: None

**RESOURCE: RAPTOR BREEDING
TERRITORIES (GOLDEN EAGLE,
PRAIRIE FALCON, SWAINSON'S HAWK)**

Stipulation: No Lease within 1/2 mile of raptor nest sites which have been active within the past five years.

Objective: To protect reproductive potential of breeding habitat for special status raptors.

Exception: None.

Modification: None.

Waiver: None.

**RESOURCE: PEREGRINE FALCON NEST
SITES/BREEDING HABITAT**

Stipulation: No Lease within one mile of peregrine falcon nest sites.

Objective: To protect peregrine falcon nesting sites and/or breeding habitat.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: FERRUGINOUS HAWKS

Stipulation: No Lease within 1/2 mile of ferruginous hawk nest sites that have been active in the past 5 years.

Objective: To maintain the reproductive potential of ferruginous hawk nest sites.

Exception: None.

Modification: None.

Waiver: None.

**RESOURCE: FERRUGINOUS HAWK
BREEDING TERRITORIES**

Stipulation: Timing Limitation. No activity is permitted from March 1 to August 31 within one mile of hawk nest sites that have been active within the past five years. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect reproductive potential of breeding habitat for special status raptors.

Exception: An exception to this stipulation may be granted by the authorized officer of the operator submits a plan that demonstrates the impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer are within one mile of raptor nest sites. The dates for the timing restriction may be modified if new information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer is within one mile of ferruginous nest sites.

RESOURCE: THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Stipulation: Controlled Surface Use. The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Objective: Avoid BLM-approved activity that will contribute to a need to list a species or their habitat as threatened or endangered.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: WESTSLOPE CUTTHROAT TROUT HABITAT (90-99% PURE)

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of stream containing known populations of 90-99% genetically pure westslope cutthroat trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Upper Missouri River and Columbia River Basins Westslope Cutthroat Trout.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would

not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP determines the stream is no longer considered important to the viability of the species.

RESOURCE: WESTSLOPE CUTTHROAT TROUT HABITAT (99-100% PURE)

Stipulation: No Lease within 1/2 mile from centerline of stream containing known populations of 99-100% genetically pure westslope cutthroat trout.

Objective: To prevent sensitive aquatic habitat and trout populations from being impacted.

Exception: None.

Modifications: None.

Waiver: None.

RESOURCE: FLUVIAL AND ADFLUVIAL ARCTIC GRAYLING HABITAT

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of stream containing known populations of Arctic grayling.

Objective: To ensure healthy aquatic habitat exists along rivers and tributaries important to the viability of fluvial and adfluvial Arctic grayling.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive Arctic grayling populations. The following mitigation measures would apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: BULL TROUT

Stipulation: No Surface Occupancy. No activity allowed within 1 mile from centerline of streams containing known populations of bull trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of bull trout.

Exception: An exception may be granted after a site assessment is conducted and if the operator can

demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: YELLOWSTONE CUTTHROAT

Stipulation: No Lease within 1/2 mile from centerline of streams containing known populations of genetically pure Yellowstone cutthroat trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Yellowstone Cutthroat.

Exception: None.

Modification: None.

Waiver: None

RESOURCE: CLASS 1 FISHERIES

Stipulation: No Surface Occupancy. No activity allowed within 1 mile from the centerline of Class 1 fishery streams (Blue Ribbon trout streams).

Objective: To ensure healthy aquatic habitat are maintained along Class 1 fisheries.

Exception: An exception may be granted if MFWP modifies the Class 1 fisheries rating. Application of the following mitigation measures apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: None.

RESOURCE: DEVELOPED RECREATION SITES

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within 1/2 mile of the boundaries of developed recreation sites. There currently 49 developed recreation sites: Beartooth Landing Rec Site, Bryant Creek Rec Site, Buffalo Hump Rec Site, Carbella Rec Site, Clark's Bay Rec Site, Crimson Bluff Rec Site, Crow Creek Rec Site, Departure Point Rec Site, Devil's Elbow Rec Site, Dickie Bridge Rec Site, Divide Bridge Campground, Divide Bridge Day Use, East Bank Rec Site, Four Corners OHV Trailhead, French Bar Rec Site, Galena Gulch Rec Site, Headlane

Trailhead, Holter Lake Dam Rec Site, Holter Lake Rec Site, Jerry Creek Br Fishing Access, John G Mine Trailhead, Log Gulch Rec Site, Lombard Historical, Lower Toston Rec Site, Maiden Rock East, McMaster Hill East Trailhead, McMaster Hill West Trailhead, Moose Creek Trailhead, Ohio Gulch OHV Trailhead, Pintlar Creek Rec Site, Pipestone OHV Rec Site, Radersburg OHV Trailhead, Ringing Rocks Rec Site, Sawlog Creek Rec Site, Sawmill Gulch Trailhead, Sheep Camp Rec Site, Sheep Mountain Trailhead, Sleeping Giant Trailhead, Spokane Bay Rec Site, Spokane Bay Trailhead, Spokane Hills South, Titan Gulch Rec Site, Toston Dam Rec Site, Tumbleweed Lane Trailhead, Two Camps Vista, Ward Ranch Historical Site, Whiskey Gulch Trailhead, White Sandy Campground, Woodsiding Trailhead.

Objective: To recognize and protect the public's opportunity for quality recreation experiences at those sites developed for that purpose. Since BLM recreation sites are generally developed to support the use of the surrounding lands, the 1/2 mile buffer offers some protection for perpetuating those opportunities for which the site was developed, as well as protecting capital investments at the site.

Exception: An exception may be granted if a site is moved or eliminated.

Modification: The list of developed recreation sites may be modified if development is removed, or if a currently undeveloped site is developed in the future.

Waiver: A waiver may be granted if a site is moved or eliminated.

RESOURCE: SPECIAL RECREATION MANAGEMENT AREAS (SRMAS)

Stipulation: No Surface Occupancy. Activity is prohibited within the boundaries of areas designated as SRMAS. This applies to the following SRMAS in this alternative: Holter Lake/Missouri River, Sleeping Giant, Hauser Lake/Lower Missouri River, Toston Reservoir/Missouri River, Scratchgravel Hills, Sheep Mountain, Pipestone, Upper Big Hole River, and Humbug Spires.

Objective: To prevent user conflicts and incompatible uses in areas with high recreational values and significant amounts of recreational activity.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating the impacts to recreation values and recreation users are acceptable or can be adequately mitigated.

Modification: The area affected by this stipulation may be modified by the authorized officer if the boundaries of the SRMA are changed.

Waiver: None.

RESOURCE: CULTURAL AND PALEONTOLOGICAL RESOURCES

Stipulation: Controlled Surface Use. An inventory of the leased lands may be required prior to surface disturbance to determine if cultural resources or paleontological localities are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

- 1) Contact the Surface Management Agency (SMA) to determine if a cultural or paleontological resource inventory is required. If an inventory is required, then;
- 2) The SMA will complete the required inventory; or the lessee or operator, at their option, may engage the services of a cultural resource consultant acceptable to the SMA to conduct an inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the planned disturbance to cover possible site relocation, or for planning purposes.
- 3) Implement mitigation measures required by the SMA. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and/or extensive recordation.
- 4) The SMA will consult with Native American tribes as per IM 2005 – 003.

The lessee or operator is required to bring to the attention of the field office manager any cultural resources or other objects of scientific interest discovered as a result of approved operations under the lease, and shall leave all discoveries intact and undisturbed until directed to proceed by the field office manager (16 U.S.C. 470).

Objective: Compliance with Section 106 of the National Historic Preservation Act is required for all actions which may affect cultural resources eligible for nomination to the National Register of Historic Places. Section 6 of the Oil and Gas Lease Terms (Form 3100-11) requires that operations be conducted in a manner that minimizes adverse impacts to cultural and other resources.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: NATIONAL REGISTER OF HISTORIC PROPERTIES ELIGIBLE PROPERTIES/DISTRICTS

Stipulation: No Surface Occupancy: Activity is prohibited within 300 feet of site boundaries and/or

districts eligible for, or listed on the National Register of Historic Places. There is one known district, the Indian Creek Historic Mining District (134 acres).

Objective: To avoid disturbance to and protect, significant properties, districts, and their settings.

Exception: An exception to this stipulation may be granted by the authorized officer if the lessee or operator submits a plan which demonstrates that the adverse impacts to cultural properties can be mitigated through data recovery and/or extensive recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the SMA, surface occupancy in that area must be prohibited.

Modification: No modification will be granted.

Waiver: No waiver will be granted.

RESOURCE: TRADITIONAL CULTURAL PROPERTIES

Stipulation: No Surface Occupancy: Activity is prohibited within ½ mile, or line-of-site of the identified Traditional Cultural Property (TCP), whichever criterion protects the viewshed of that property.

Objective: To avoid disturbance and protect cultural properties determined to be of particular importance to Native American Groups, determined to be Traditional Cultural Properties, and/or designated to be for traditional use.

Exception: An exception to this stipulation may be granted by the authorized officer if the Indian community no longer attaches those traditional values to the lease area.

Modification: No modification will be granted.

Waiver: No waiver will be granted.

RESOURCE: VRM CLASS II, III & IV

Stipulation: Controlled Surface Use. All surface disturbing activities and construction of semi-permanent facilities and permanent facilities may require special design including location, painting, and camouflage to blend with the natural surroundings and meet the visual quality objectives for respective class.

Objective: To control the visual impacts of activities and facilities within acceptable levels.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: WETLANDS, FLOODPLAINS, RIPARIAN AREAS, AND WATER QUALITY

Stipulation: No Surface Occupancy. Activity is prohibited within wetlands, floodplains, and riparian areas.

Objective: To maintain riparian/wetland functions and water quality.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: None.

Waiver: None.

RESOURCE: SPECIAL STATUS PLANT HABITATS

Stipulation: Controlled Surface Use. A field inspection will be conducted for special status plant species by the lessee prior to any surface disturbance. A list of special status plant species will be provided to the lessee at the time of the lease. Plant Species on the list are subject to change over time as new information becomes available. Plant inventories must be conducted at a time of year when the target species are identifiable. A report must be provided to the BLM documenting the presence or absence of special status plants in the area proposed for surface disturbance. The findings of this report may result in restrictions to the operator's plans or may preclude use and occupancy.

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: An exception may be granted if BLM determines that the portion of the lease identified for surface disturbing activities does not support special status plant species or provide potential habitat for these species.

Modification: The boundaries of the area to be inventoried for special status plants may be modified if BLM determines that a large portion of the lease identified for surface disturbing activities doesn't support special status plant species or provide potential habitat for these species.

Waiver: The field inspection and plant inventory may be waived by the authorized if he/she determines that the subject lease occurs in an area with no known populations of special status plant species and that the area doesn't provide habitat for those species.

RESOURCE: KNOWN OR DISCOVERED SPECIAL STATUS PLANTS OR POPULATIONS

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within ½ mile of special status plant species.

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: None.

Modification: The boundaries of the no surface occupancy area may be modified if BLM determines that land within ½ mile of the special status plant population does not provide potential habitat for these species.

Waiver: None.

RESOURCE: MUNICIPAL WATERSHEDS

Stipulation: No Lease. No leases would be allowed within the following municipal watersheds: Missouri River Siphon, Tenmile Creek Drainage, Big Hole River Intake, and Moulton Reservoir.

Objective: To protect drinking water for Municipalities within the Butte Field Office.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: SLOPES >30% ON NON-BOULDER BATHOLITH SOILS OR SLOPES >20% ON BOULDER BATHOLITH SOILS

Stipulation: Controlled Surface Use. Prior to surface disturbance on slopes greater than 30 on non-Boulder Batholith soils or 20 percent on Boulder Batholith soils, an engineering/reclamation plan must be approved by the authorized officer. Such plan must demonstrate how the following will be accomplished:

- Site productivity will be restored.
- Surface runoff will be adequately controlled.
- Off-site areas will be protected from accelerated soil erosion.
- Surface disturbing activities will not be conducted during extended wet periods.

Objective: To maintain soil productivity and provide necessary protection to prevent excessive soil erosion on steep slopes.

Exceptions: An exception may be granted if the operator can demonstrate in a plan of operations that

adverse effects can be minimized and activities safely conducted.

Modifications: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of area do not include slopes over 30 percent on non-Boulder Batholith soils or 20 percent on Boulder Batholith, or the operator can demonstrate in a plan of operations that adverse effects can be minimized.

Waiver: This stipulation may be waived by the authorized officer if it is determined that none of the leasehold contains slopes greater than 30 percent on non-Boulder Batholith soils or 20 percent on Boulder Batholith soils.

RESOURCE: DESIGNATED NATIONAL HISTORIC TRAILS – LEWIS AND CLARK TRAIL

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within 1 mile of designated National Historic Trail.

Objective: To preserve and protect designated National Historic Trails and the natural setting in which they occur.

Exception: No exceptions will be granted.

Modification: No modifications will be granted.

Waiver: No waivers will be granted.

RESOURCE: CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL (MARYSVILLE)

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within 1/2 mile of the Continental Divide National Scenic Trail.

Objective: To preserve and protect the existing scenic character of the landscape along the trail.

Exception: May be granted if this portion of the trail is relocated.

Modification: Modification may be granted should the trail be relocated.

Waiver: May be granted if trail is moved from current location.

RESOURCE: RIVERS SUITABLE FOR WILD AND SCENIC RIVER DESIGNATION

Stipulation: No Surface Occupancy. Activity would be prohibited within 1 mile either side of the active river channel. This stipulation would apply to the following stream/river segment lengths: 2.3 miles of the upper Big

Hole River, 3.1 miles of the upper Missouri River, 4.0 miles of Moose Creek, and 2.6 miles of Muskrat Creek.

Objective: To protect river corridors considered suitable for inclusion in the National Wild and Scenic Rivers system and the associated outstandingly remarkable values.

Exception: None

Modification: None

Waiver: None

RESOURCE: RECREATION AND PUBLIC PURPOSES ACT LEASES AND PATENTS, AND 2920 AUTHORIZATIONS

Stipulation: No Surface Occupancy (NSO). Surface Occupancy and use is prohibited on Recreation & Public Purposes leases and patents and on leases and permits authorized under regulations found at 43 CFR 2920.

Objective: To protect developed facilities and commercial, recreational, and public uses and prevent incompatible uses on existing authorized areas.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated in coordination with the holder of the land use authorization.

Modification: The area affected by this stipulation may be modified by the authorized officer if land use authorization boundaries are modified.

Waiver: This stipulation may be waived by the authorized officer if land use authorization boundaries are modified.

ALTERNATIVE D OIL AND GAS STIPULATIONS

RESOURCE: PRAIRIE DOG TOWNS

Stipulation: No Surface Occupancy. Activity is prohibited within the boundary of any prairie dog town.

Objective: To protect habitat for prairie dog towns.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting prairie dogs.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP and USFWS, determines that the entire leasehold no longer contains prairie dogs.

RESOURCE: SAGE GROUSE WINTER/SPRING RANGE

Stipulation: Timing Limitation. No activity from December 1 through May 15. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect sage grouse winter range from disturbance during the winter/spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer in consultation with MFWP and the USFWS, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain sage grouse winter/spring range. The dates for the timing restriction may be modified if new information indicates that the December 1 through May 15 dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer contains sage grouse winter/spring range, or if in coordination with MFWP and the USFWS, determines that the area is not critical for sage grouse.

RESOURCE: SAGE GROUSE STRUTTING GROUNDS (LEKS)

Stipulation: No Surface Occupancy. Activity is prohibited within 1/4 mile of sage grouse leks.

Objective: To protect sage grouse strutting grounds and leks to maintain regional sage grouse populations.

Exception: An exception to this stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Waiver: The stipulation may be waived if the authorized officer, in consultation with MFWP and the USFWS, determines that the entire leasehold can be occupied without adversely affecting sage grouse leks.

RESOURCE: SAGE GROUSE BREEDING HABITAT

Stipulation: Timing Limitation. Activity is restricted from March 1 through June 30 in nesting and early brood rearing habitat (defined as within three miles of leks). This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect sage grouse leks and breeding habitat necessary for long-term maintenance of regional sage grouse populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold can be occupied without adversely affecting sage grouse leks or the surrounding breeding habitat.

RESOURCE: WILDLIFE MANAGEMENT AREAS

Stipulation: No Surface Occupancy. Activity is prohibited within the boundary of State Game Ranges administered by MFWP.

Objective: To protect MFWP elk winter range necessary for long-term maintenance of regional elk populations and other wildlife values.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: BIG GAME WINTER/SPRING RANGE

Stipulation: Timing Limitation. No activity from December 1 through May 15 within winter range for wildlife. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect mule deer, elk, antelope, and moose winter/spring range from disturbance during the

winter/spring season, and to facilitate long-term maintenance of wildlife populations.

Exception: An exception to this stipulation may be granted by the authorized officer in consultation with MFWP, if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with MFWP, determines that portions of the area no longer contain wildlife winter/spring range. The dates for the timing restriction may be modified if new wildlife use information indicates that the December 1 through May 15 dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains winter/spring range for wildlife.

RESOURCE: BIGHORN SHEEP YEARLONG RANGE

Stipulation: Timing Limitation. Activity is prohibited from November 1 through June 30 in bighorn rutting, winter and lambing habitat. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect bighorn rutting, winter and lambing habitat from disturbance and facilitate long-term maintenance of bighorn sheep populations.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain rutting, winter, and lambing habitat for bighorn sheep. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

Waiver: This stipulation may be waived if the authorized officer, in consultation with MFWP, determines that the entire leasehold no longer contains bighorn sheep rutting, winter or lambing areas.

RESOURCE: BALD EAGLE NEST SITES/BREEDING HABITAT

Stipulation: No Surface Occupancy. Activity is prohibited within 1/2 mile of bald eagle nest sites and within bald eagle nesting habitat in riparian areas.

Objective: To protect bald eagle nesting sites and/or breeding habitat in accordance with the Endangered Species Act and the Montana Bald Eagle Management Plan.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bald eagle or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with the USFWS.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with USFWS, determines that the area can be occupied without adversely affecting bald eagle nest sites or nesting habitats.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest sites or nesting habitat.

RESOURCE: BALD EAGLE NEST SITES/BREEDING HABITAT

Stipulation: Timing Limitation. No activity is allowed from February 1 through August 31 in a one mile radius around bald eagle nest sites. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To protect bald eagle nesting site and/or breeding habitat in accordance with the Endangered Species Act and the Montana Bald Eagle Management Plan.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect the bald eagle or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with the USFWS.

Modification: A modification may be granted if new habitat studies show that a portion of the area is not used by eagles.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting bald eagle nest sites or nesting habitat.

RESOURCE: PEREGRINE FALCON NEST SITES/BREEDING HABITAT

Stipulation: No Surface Occupancy. Activity is prohibited within one mile of peregrine falcon nest sites.

Objective: To protect peregrine falcon nesting sites and/or breeding habitat.

Exception: An exception may be granted by the authorized officer if the operator submits a plan that demonstrates that the proposed action will not affect the peregrine falcon or its habitat. If the authorized officer determines that the action may have an adverse affect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in consultation with USFWS.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with USFWS, determines that portions of the area can be occupied without adversely affecting peregrine falcon nest sites or breeding habitat.

Waiver: This stipulation may be waived if the authorized officer, in consultation with USFWS, determines that the entire leasehold can be occupied without adversely affecting peregrine falcon nest sites or breeding habitat.

RESOURCE: FERRUGINOUS HAWK BREEDING TERRITORIES

Stipulation: Timing Limitation. No activity is allowed from March 1 through July 31 within 1/2 mile of ferruginous hawk nest sites that have been active within the past 5 years. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Objective: To maintain the reproductive potential of ferruginous hawk nest sites.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrated that the impacts from the proposed action are minimal or can be adequately mitigated.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting the production potential of ferruginous hawk nest sites.

Waiver: This stipulation may be waived if the authorized officer determines that the entire leasehold can be occupied without adversely affecting the production potential of ferruginous hawk nest sites.

RESOURCE: THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Stipulation: Controlled Surface Use. The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Objective: Avoid BLM-approved activity that will contribute to a need to list a species or their habitat as threatened or endangered.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: WESTSLOPE CUTTHROAT TROUT HABITAT (90-99% PURE)

Stipulation: Controlled Surface Use. Activities within 1/2 mile of streams containing populations of westslope cutthroat trout with purity of 90-99% may be relocated, require special design, or require on and off site mitigation measures to prevent impacts to sensitive trout populations.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Upper Missouri River and Columbia River Basins Westslope Cutthroat Trout.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP determines the stream is no longer considered important to the viability of the species.

RESOURCE: WESTSLOPE CUTTHROAT TROUT HABITAT (99-100% PURE)

Stipulation: No Surface Occupancy. No activity allowed within ½ mile from centerline of stream containing known populations of 99-100% genetically pure westslope cutthroat trout.

Objective: To prevent sensitive aquatic habitat and trout populations from being impacted.

Exception: An exemption may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modifications: None.

Waiver: A waiver may be granted if the MFWP determines the stream is no longer considered important to the viability of the species.

RESOURCE: FLUVIAL AND ADFLUVIAL ARCTIC GRAYLING HABITAT

Stipulation: Controlled Surface Use. Activities may be relocated, require special design, or require on and off site mitigation measures to prevent impacts to grayling populations and habitat located in the Big Hole.

Objective: To ensure healthy aquatic habitat exists along rivers and tributaries important to the viability of fluvial and adfluvial Arctic grayling.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect Arctic grayling populations. The following mitigation measures would apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: BULL TROUT

Stipulation: No Surface Occupancy. No activity allowed within 1/2 mile from centerline of streams containing known populations of bull trout.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of bull trout.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. Apply the following mitigation measures:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: YELLOWSTONE CUTTHROAT

Stipulation: Controlled Surface Use. Activities may be relocated, require special design, or require on and off site mitigation measures to prevent impacts to Yellowstone cutthroat trout populations and habitat located in the Yellowstone Watershed.

Objective: To ensure healthy aquatic habitat exists in drainages important to the viability of Yellowstone Cutthroat.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that adverse effects can be eliminated and activities would not affect sensitive trout populations. The following mitigation measures would apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: A waiver may be granted if the MFWP and the USFWS determines the stream is no longer considered important to the viability of the species.

RESOURCE: CLASS 1 FISHERIES

Stipulation: Controlled Surface Use. Activities may be relocated, require special design, or require on and off site mitigation measures to protect Class 1 fishery streams (Blue Ribbon trout streams).

Objective: To ensure healthy aquatic habitat are maintained along Class 1 fisheries.

Exception: An exception may be granted if MFWP modifies the Class 1 fisheries rating. Application of the following mitigation measures apply:

- a) No net increase in sediment over existing condition.
- b) No adverse effects on water quality and quantity.

Modification: None.

Waiver: None.

RESOURCE: DEVELOPED RECREATION SITES

Stipulation: Controlled Surface Use. Activities within ¼ mile of developed recreation sites must be conducted in a manner to minimize surface disturbance, avoid facilities, and minimize impacts with other public land users. There are currently 49 developed recreation sites: Beartooth Landing Rec Site, Bryant Creek Rec Site, Buffalo Hump Rec Site, Carbella Rec Site, Clark's Bay Rec Site, Crimson Bluff Rec Site, Crow Creek Rec Site, Departure Point Rec Site, Devil's Elbow Rec Site, Dickie Bridge Rec Site, Divide Bridge Campground, Divide Bridge Day Use, East Bank Rec Site, Four Corners OHV Trailhead, French Bar Rec Site, Galena Gulch Rec Site, Headlane Trailhead, Holter Lake Dam Rec Site, Holter Lake Rec Site, Jerry Creek Br Fishing Access, John G Mine Trailhead, Log Gulch Rec Site, Lombard Historical, Lower Toston Rec Site, Maiden Rock East, McMaster Hill East Trailhead, McMaster Hill West Trailhead, Moose Creek Trailhead, Ohio Gulch OHV Trailhead, Pintlar Creek Rec Site, Pipestone OHV Rec Site, Radersburg OHV Trailhead, Ringing Rocks Rec Site, Sawlog Creek Rec Site, Sawmill Gulch Trailhead, Sheep Camp Rec Site, Sheep Mountain Trailhead, Sleeping Giant Trailhead, Spokane Bay Rec Site, Spokane Bay Trailhead, Spokane Hills South, Titan Gulch Rec Site, Toston Dam Rec Site, Tumbleweed Lane Trailhead, Two Camps Vista, Ward Ranch Historical Site, Whiskey Gulch Trailhead, White Sandy Campground, Woodsiding Trailhead.

Objective: To recognize and protect the public's opportunity for quality recreation experiences at those sites developed for that purpose. A ¼ mile buffer would protect capital investment and, to some extent, visitors' recreation experiences while at the site.

Exception: An exception may be granted if a site is moved or eliminated.

Modification: The list of developed recreation sites may be modified if development is removed, or if a currently undeveloped site is developed in the future.

Waiver: A waiver may be granted if a site is moved or eliminated.

RESOURCE: CULTURAL AND PALEONTOLOGICAL RESOURCES

Stipulation: Controlled Surface Use. An inventory of the leased lands may be required prior to surface disturbance to determine if cultural resources or paleontological localities are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

- 1) Contact the Surface Management Agency to determine if a cultural or paleontological resource inventory is required. If an inventory is required, then;
- 2) The SMA will complete the required inventory; or the lessee or operator, at their option, may engage the services of a cultural resource consultant acceptable to the SMA to conduct an inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the planned disturbance to cover possible site relocation, or for planning purposes.
- 3) Implement mitigation measures required by the SMA. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and/or extensive recordation.
- 4) The SMA will consult with Native American tribes as per IM 2005 – 003.

The lessee or operator is required to bring to the attention of the field office manager any cultural resources or other objects of scientific interest discovered as a result of approved operations under the lease, and shall leave all discoveries intact and undisturbed until directed to proceed by the field office manager (16 U.S.C. 470).

Objective: Compliance with Section 106 of the National Historic Preservation Act is required for all actions which may affect cultural resources eligible for nomination to the National Register of Historic Places. Section 6 of the Oil and Gas Lease Terms (Form 3100-11) requires that operations be conducted in a manner that minimizes adverse impacts to cultural and other resources.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: NATIONAL REGISTER OF HISTORIC PROPERTIES ELIGIBLE PROPERTIES/DISTRICTS

Stipulation: No Surface Occupancy: Activity is prohibited within 300 feet of site boundaries and/or districts eligible for, or listed on the National Register of Historic Places. There is one known district, the Indian Creek Historic Mining District (134 acres).

Objective: To avoid disturbance to and protect, significant properties, districts, and their settings.

Exception: An exception to this stipulation may be granted by the authorized officer if the lessee or operator submits a plan which demonstrates that the adverse impacts to cultural properties can be mitigated through data recovery and/or extensive recordation. Where

impacts to cultural resources cannot be mitigated to the satisfaction of the Surface Management Agency, surface occupancy in that area must be prohibited.

Modification: No modification will be granted.

Waiver: No waiver will be granted.

RESOURCE: TRADITIONAL CULTURAL PROPERTIES

Stipulation: No Surface Occupancy: Activity is prohibited within ½ mile, or line-of-site of the identified Traditional Cultural Property, whichever criterion protects the viewshed of that property.

Objective: To avoid disturbance and protect cultural properties determined to be of particular importance to Native American Groups, determined to be Traditional Cultural Properties, and/or designated to be for traditional use.

Exception: An exception to this stipulation may be granted by the authorized officer if the Indian community no longer attaches those traditional values to the lease area.

Modification: No modification will be granted.

Waiver: No waiver will be granted.

RESOURCE: WETLANDS, FLOODPLAINS, RIPARIAN AREAS, AND WATER QUALITY

Stipulation: No Surface Occupancy. Activity is prohibited within wetlands, floodplains, and riparian areas.

Objective: To maintain riparian/wetland functions and water quality.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated.

Modification: None.

Waiver: None.

RESOURCE: SPECIAL STATUS PLANT HABITATS

Stipulation: Controlled Surface Use. A field inspection will be conducted for special status plant species by the lessee prior to any surface disturbance. A list of special status plant species will be provided to the lessee at the time of the lease. Plant Species on the list are subject to change over time as new information becomes available. Plant inventories must be conducted at a time of year when the target species are identifiable. A report must be provided to the BLM documenting the presence or absence of special status plants in the area proposed for

surface disturbance. The findings of this report may result in restrictions to the operator's plans or may preclude use and occupancy.

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: An exception may be granted if BLM determines that the portion of the lease identified for surface disturbing activities does not support special status plant species or provide potential habitat for these species.

Modification: The boundaries of the area to be inventoried for special status plants may be modified if BLM determines that a large portion of the lease identified for surface disturbing activities doesn't support special status plant species or provide potential habitat for these species.

Waiver: The field inspection and plant inventory may be waived by the authorized if he/she determines that the subject lease occurs in an area with no known populations of special status plant species and that the area doesn't provide habitat for those species.

RESOURCE: KNOWN OR DISCOVERED SPECIAL STATUS PLANTS OR POPULATIONS

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within special status plant population locations.

Objective: Protect and conserve rare plants, associated plant communities and the habitat that supports them.

Exception: None.

Modification: None.

Waiver: None.

RESOURCE: MUNICIPAL WATERSHEDS

Stipulation: Controlled Surface Use. All lease operations will avoid negative impacts to water at the intakes of the following municipal watersheds that overlap portions of the lease: Missouri River Siphon, Tenmile Creek Drainage, Big Hole River Intake, and Moulton Reservoir. Measures may include relocation of proposed roads, drilling sites and other facilities, or application of appropriate mitigating measures mentioned in the list of conditions attached to the APD.

Objective: To protect drinking water for Municipalities within the Butte Field Office.

Exception: An exception may be granted after a site assessment is conducted and if the operator can demonstrate in a surface use plan of operations that water quality at intakes will meet drinking water standards established by MDEQ.

Modification: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied and water quality at intakes will meet drinking water standards established by MDEQ.

Waiver: This stipulation may be waived if the authorized officer determines that operations will not cause water quality at intakes to fail to meet drinking water standards established by MDEQ.

RESOURCE: RECREATION AND PUBLIC PURPOSES ACT LEASES AND PATENTS, AND 2920 AUTHORIZATIONS

Stipulation: No Surface Occupancy. Surface Occupancy and use is prohibited on Recreation & Public Purposes leases and patents and on leases and permits authorized under regulations found at 43 CFR 2920.

Objective: To protect developed facilities and commercial, recreational, and public uses and prevent incompatible uses on existing authorized areas.

Exception: An exception to this stipulation may be granted by the authorized officer if the operator submits a plan demonstrating that impacts from the proposed action are acceptable or can be adequately mitigated in coordination with the holder of the land use authorization.

Modification: The area affected by this stipulation may be modified by the authorized officer if land use authorization boundaries are modified.

Waiver: This stipulation may be waived by the authorized officer if land use authorization boundaries are modified.

ADDITIONAL INFORMATION

- Form 3100-11: Offer to Lease and Lease for Oil and Gas
- Form 3109-1: Lease Stipulations
- Form GP-135: Special Stipulation Bureau of Reclamation

Form 3100-11
(July 2006)UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial Number

OFFER TO LEASE AND LEASE FOR OIL AND GAS

The undersigned (page 2) offers to lease all or any of the lands in Item 2 that are available for lease pursuant to the Mineral Lands Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351-359), or _____ (other).

READ INSTRUCTIONS BEFORE COMPLETING

1. Name

Street

City, State, Zip Code

2. This application/offer/lease is for: (Check Only One) ☐ PUBLIC DOMAIN LANDS ☐ ACQUIRED LANDS (percent U.S. interest _____)

Surface managing agency if other than Bureau of Land Management (BLM): _____ Unit/Project _____

Legal description of land requested: *Parcel No.: _____ *Sale Date (mm/dd/yyyy): _____

***See Item 2 in Instructions below prior to completing Parcel Number and Sale Date.**

T.

R.

Meridian

State

County

Amount remitted: Filing fee \$ _____ Rental fee \$ _____ Total acres applied for _____

Total \$ _____

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T.

R.

Meridian

State

County

Total acres in lease _____

Rental retained \$ _____

This lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas (except helium) in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

NOTE: This lease is issued to the high bidder pursuant to his/her duly executed bid or nomination form submitted under 43 CFR 3120 and is subject to the provisions of that bid or nomination and those specified on this form.

Type and primary term:

THE UNITED STATES OF AMERICA

☐ Noncompetitive lease (ten years)by _____
(BLM)☐ Competitive lease (ten years)

(Title)

(Date)

☐ Other _____ EFFECTIVE DATE OF LEASE _____

(Continued on page 2)

4. (a) Undersigned certifies that (1) offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or Territory thereof, (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect, in each public domain and acquired lands separately in the same State, do not exceed 246,080 acres in oil and gas leases (of which up to 200,000 acres may be in oil and gas options or 300,000 acres in leases in each leasing District in Alaska of which up to 200,000 acres may be in options), (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located; (5) offeror is in compliance with qualifications concerning Federal coal lease holdings provided in sec. 2(a)(2)(A) of the Mineral Leasing Act; (6) offeror is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (7) offeror is not in violation of sec. 41 of the Act. (b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or in part unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments.

Duly executed this _____ day of _____, 20____ (Signature of Lessee or Attorney-in-fact)

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212 make it a crime for any person knowingly and willfully to make to any department or Agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

LEASE TERMS

Sec. 1. Rentals--Rentals must be paid to proper office of lessor in advance of each lease year. Annual rental rates per acre or fraction thereof are:

- (a) Noncompetitive lease, \$1.50 for the first 5 years; thereafter \$2.00;
- (b) Competitive lease, \$1.50; for the first 5 years; thereafter \$2.00;
- (c) Other, see attachment, or

as specified in regulations at the time this lease is issued.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties must be paid on the production allocated to this lease. However, annual rentals must continue to be due at the rate specified in (a), (b), or (c) rentals for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) must automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties--Royalties must be paid to proper office of lessor. Royalties must be computed in accordance with regulations on production removed or sold. Royalty rates are:

- (a) Noncompetitive lease, 12 1/2%;
- (b) Competitive lease, 12 1/2 %;
- (c) Other, see attachment; or

as specified in regulations at the time this lease is issued.

Lessor reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and an opportunity to be heard. When paid in value, royalties must be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production must be delivered, unless otherwise agreed to by lessor, in merchantable condition on the premises where produced without cost to lessor. Lessee must not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor must lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty in lieu of rental of not less than the rental which otherwise would be required for that lease year must be payable at the end of each lease year beginning on or after a discovery in paying quantities. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge will be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA) (30 U.S.C. 1701). Lessee must be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to the failure to comply with any rule, regulation, order, or citation issued under FOGRMA or the leasing authority.

(Continued on page 3)

(Form 3100-11, page 2)

Sec. 3. Bonds - A bond must be filed and maintained for lease operations as required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage - Lessee must exercise reasonable diligence in developing and producing, and must prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee must drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection - Lessee must file with proper office of lessor, not later than 30 days after effective date thereof, any contract or evidence of other arrangement for sale or disposal of production. At such times and in such form as lessor may prescribe, lessee must furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessor, lessee must keep a daily drilling record, a log, information on well surveys and tests, and a record of subsurface investigations and furnish copies to lessor when required. Lessee must keep open at all reasonable times for inspection by any representative of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee must maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that supports costs claimed as manufacturing, preparation, and/or transportation costs. All such records must be maintained in lessee's accounting offices for future audit by lessor. Lessee must maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section will be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations - Lessee must conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee must take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses must be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee must contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee must immediately contact lessor. Lessee must cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining operations - To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 8. Extraction of helium - Lessor reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessor at no expense or loss to lessee or owner of the gas. Lessee must include in any contract of sale of gas the provisions of this section.

Sec. 9. Damages to property - Lessee must pay lessor for damage to lessor's improvements, and must save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 10. Protection of diverse interests and equal opportunity - Lessee must pay, when due, all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; and take measures necessary to protect the health and safety of the public.

Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated accessible to oil derived from these leased lands, lessee must comply with section 28 of the Mineral Leasing Act of 1920.

Lessee must comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors must maintain segregated facilities.

Sec. 11. Transfer of lease interests and relinquishment of lease - As required by regulations, lessee must file with lessor any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which will be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. Delivery of premises - At such time as all or portions of this lease are returned to lessor, lessee must place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

Sec. 13. Proceedings in case of default - If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to cancellation unless or until the leasehold contains a well capable of production of oil or gas in paying quantities, or the lease is committed to an approved cooperative or unit plan or communitization agreement which contains a well capable of production of unitized substances in paying quantities. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver will not prevent later cancellation for the same default occurring at any other time. Lessee will be subject to applicable provisions and penalties of FOGRMA (30 U.S.C. 1701).

Sec. 14. Heirs and successors-in-interest - Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to the heirs, executors, administrators, successors, beneficiaries, or assignees of the respective parties hereto.

(Continued on page 4)

(Form 3100-11, page 3)

A. General:

1. Page 1 of this form is to be completed only by parties filing for a noncompetitive lease. The BLM will complete page 1 of the form for all other types of leases.
2. Entries must be typed or printed plainly in ink. Offeror must sign Item 4 in ink.
3. An original and two copies of this offer must be prepared and filed in the proper BLM State Office. See regulations at 43 CFR 1821.2-1 for office locations.
4. If more space is needed, additional sheets must be attached to each copy of the form submitted.

B. Special:

Item 1 - Enter offeror's name and billing address.

Item 2 - Identify the mineral status and, if acquired lands, percentage of Federal ownership of applied for minerals. Indicate the agency controlling the surface of the land and the name of the unit or project which the land is a part. The same offer may not include both Public

Domain and Acquired lands. Offeror also may provide other information that will assist in establishing title for minerals. The description of land must conform to 43 CFR 3110. A single parcel number and Sale Date will be the only acceptable description during the period from the first day following the end of a competitive process until the end of that same month, using the parcel number on the List of Lands Available for Competitive Nominations or the Notice of Competitive Lease Sale, whichever is appropriate.

Payments: The amount remitted must include the filing fee and the first year's rental at the rate of \$1.50 per acre or fraction thereof. The full rental based on the total acreage applied for must accompany an offer even if the mineral interest of the United States is less than 100 percent. The filing fee will be retained as a service charge even if the offer is completely rejected or withdrawn. To protect priority, it is important that the rental submitted be sufficient to cover all the land requested. If the land requested includes lots or irregular quarter-quarter sections, the exact area of which is not known to the offeror, rental should be submitted on the basis of each such lot or quarter-quarter section containing 40 acres. If the offer is withdrawn or rejected in whole or in part before a lease issues, the rental remitted for the parts withdrawn or rejected will be returned.

Item 3 - This space will be completed by the United States.

NOTICES

The Privacy Act of 1974 and the regulations in 43 CFR 2.48(d) provide that you be furnished with the following information in connection with information required by this oil and gas lease offer.

AUTHORITY: 30 U.S.C. 181 et seq.; 30 U.S.C 351-359.

PRINCIPAL PURPOSE: The information is to be used to process oil and gas offers and leases.

ROUTINE USES: (1) The adjudication of the lessee's rights to the land or resources. (2) Documentation for public information in support of notations made on land status records for the management, disposal, and use of public lands and resources. (3) Transfer to appropriate Federal agencies when consent or concurrence is required prior to granting a right in public lands or resources. (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: If all the information is not provided, the offer may be rejected. See regulations at 43 CFR 3100.

The Paperwork Reduction Act of 1995 requires us to inform you that:

This information is being collected pursuant to the law.

This information will be used to create and maintain a record of oil and gas lease activity.

Response to this request is required to obtain a benefit.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 1 hour per response including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0185), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop, 401LS, Washington, D.C. 20240.

Form 3109-1
(December 1972)
(formerly 3103-1)

LEASE STIPULATIONS
BUREAU OF RECLAMATION

The lessee agrees to maintain, if required by the lessor during the period of this lease, including any extension thereof, an additional bond with qualified sureties in such sum as the lessor, if it considers that the bond required under Section 2(a) is insufficient, may at any time require:

(a) to pay for damages sustained by any reclamation homestead entryman to his crops or improvements caused by drilling or other operations of the lessee, such damages to include the reimbursement of the entryman by the lessee, when he uses or occupies the land of any homestead entryman, for all construction and operation and maintenance charges becoming due during such use or occupation upon any portion of the land so used and occupied;

(b) to pay any damage caused to any reclamation project or water supply thereof by the lessee's failure to comply fully with the requirements of this lease; and

(c) to recompense any nonmineral applicant, entryman, purchaser under the Act of May 16, 1930 (46 Stat. 367), or patentee for all damages to crops or to tangible improvements caused by drilling or other prospecting operation, where any of the lands covered by this lease are embraced in any nonmineral application, entry, or patent under rights initiated prior to the date of this lease, with a reservation of the oil deposits, to the United States pursuant to the Act of July 17, 1914 (38 Stat. 509).

As to any lands covered by this lease within the area of any Government reclamation project, or in proximity thereto, the lessee shall take such precautions as required by the irrigation under such project or to the water supply thereof; *provided* that drilling is prohibited on any constructed works or right-of-way of the Bureau of Reclamation, and *provided, further*, that there is reserved to the lessor, its successors and assigns, the superior and prior right at all times to construct, operate, and maintain dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, appurtenant irrigation structures, and reclamation works, in which construction, operation, and maintenance, the lessor, its successors and assigns, shall have the right to use any or all of the lands herein described without making compensation therefore, and shall not be responsible for any damage from the presence of water thereon or on account of ordinary, extraordinary, unexpected, or unprecedented floods. That nothing shall be done under this lease to increase the cost of, or interfere in any manner with, the construction, operation, and maintenance of such works. It is agreed by the lessee that, if the construction of any or all of said dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone or telegraph lines, electric transmission lines, roadways, appurtenant irrigation structures or reclamation works across, over, or upon said lands should be made more expensive by reason of the existence of the improvements and workings of the lessee thereon, said additional expense is to be estimated by the Secretary of the Interior, whose estimate is to be final and binding upon the parties hereto, and that within thirty (30) days after demand

is made upon the lessee for payment of any such sums, the lessee will make payment thereof to the United States, or its successors, constructing such dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, appurtenant irrigation structures, or reclamation works, across, over, or upon said lands; *provided, however*, that subject to advance written approval by the United States, the location and course of any improvements or works and appurtenances may be changed by the lessee; *provided, further*, that the reservations, agreements, and conditions contained in the within lease shall be and remain applicable notwithstanding any change in the location or course of said improvements or works of lessee. The lessee further agrees that the United States, its officers, agents, and employees, and its successors and assigns shall not be held liable for any damage to the improvements or workings of the lessee resulting from the construction, operation, and maintenance of any of the works hereinabove enumerated. Nothing in this paragraph shall be construed as in any manner limiting other reservations in favor of the United States contained in this lease.

THE LESSEE FURTHER AGREES That there is reserved to the lessor, its successors and assigns, the prior right to use any of the lands herein leased, to construct, operate, and maintain dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, or appurtenant irrigation structures, and also the right to remove construction materials therefrom, without any payment made by the lessor or its successors for such right, with the agreement on the part of the lessee that if the construction of any or all of such dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, or appurtenant irrigation structures across, over, or upon said lands or the removal of construction materials therefrom, should be made more expensive by reason of the existence of improvements or workings of the lessee thereon, such additional expense is to be estimated by the Secretary of the Interior, whose estimate is to be final and binding upon the parties hereto, and that within thirty (30) days after demand is made upon the lessee for payment of any such sums, the lessee will make payment thereof to the United States or its successors constructing such dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, or appurtenant irrigation structures across, over, or upon said lands or removing construction materials therefrom. The lessee further agrees that the lessor, its officers, agents, and employees and its successors and assigns shall not be held liable for any damage to the improvements or workings of the lessee resulting from the construction, operation, and maintenance of any of the works herein above enumerated. Nothing contained in this paragraph shall be construed as in any manner limiting other reservations in favor of the lessor contained in this lease.

To insure against the contamination of the waters of the _____ Reservoir,
_____, Project, State of _____, the lessee agrees that the following further conditions shall apply to
all drilling and operations on lands covered by this lease, which lie within the flowage or drainage area of the
Reservoir, as such area is defined by the Bureau of Reclamation:

1. The drilling sites for any and all wells shall be approved by the Superintendent, Bureau of Reclamation, _____ Project, before drilling begins. Sites for the construction of pipe-line rights-of-way or other authorized facilities shall also be approved by the Superintendent before construction begins.

2. All drilling or operation methods or equipment shall, before their employment, be inspected and approved by the Superintendent of the _____ Project, _____, and by the supervisor of the U.S. Geological Survey having jurisdiction over the area.

GPO 854-703

GP-135

(02/03)

SPECIAL STIPULATION - BUREAU OF RECLAMATION

To avoid interference with recreation development and/or impacts to fish and wildlife habitat and to assist in preventing damage to any Bureau of Reclamation dams, reservoirs, canals, ditches, laterals, tunnels, and related facilities, and contamination of the water supply therein, the lessee agrees that the following conditions shall apply to all exploration and developmental activities and other operation of the works thereafter on lands covered by this lease:

1. Prior to commencement of any surface-disturbing work including drilling, access road work, and well location construction, a surface use and operations plan will be filed with the appropriate officials. A copy of this plan will be furnished to the Regional Director, Great Plains Region, Bureau of Reclamation, P.O. Box 36900, Billings, MT 59107-6900, for review and consent prior to approval of the plan. Such approval will be conditioned on reasonable requirements needed to prevent soil erosion, water pollution, and unnecessary damages to the surface vegetation and other resources, including cultural resources, of the United States, its lessees, permittees, or licensees, and to provide for the restoration of the land surface and vegetation. The plan shall contain provisions as the Bureau of Reclamation may deem necessary to maintain proper management of the water, recreation, lands structures, and resources, including cultural resources, within the prospecting, drilling, or construction area.

Drilling sites for all wells and associated investigations such as seismograph work shall be included in the above-mentioned surface use and operation plan.

If later explorations require departure from or additions to the approved plan, these revisions or amendments, together with a justification statement for proposed revisions, will be submitted for approval to the Regional Director, Great Plains Region, Bureau of Reclamation, or his authorized representative.

Any operations conducted in advance of approval of an original, revised, or amended prospecting plan, or which are not in accordance with an approved plan constitute a violation of the terms of this lease. The Bureau of Reclamation reserves the right to close down operations until such corrective action, as is deemed necessary, is taken by the lessee.

2. No occupancy of the surface of the following excluded areas is authorized by this lease. It is understood and agreed that the use of these areas for Bureau of Reclamation purposes is superior to any other use. The following restrictions apply only to mineral tracts located within the boundary of a Bureau of Reclamation project where the United States owns 100 percent of the fee mineral interest.

- a. Within 500 feet on either side of the centerline of any and all roads or highways within the leased area.
- b. Within 200 feet on either side of the centerline of any and all trails within the leased area.
- c. Within 500 feet of the normal high-water line of any and all live streams in the leased area.
- d. Within 400 feet of any and all recreation developments within the leased area.
- e. Within 400 feet of any improvements either owned, permitted, leased, or otherwise authorized by the Bureau of Reclamation within the leased area.
- f. Within 200 feet of established crop fields, food plots, and tree/shrub plantings within the leased area.
- g. Within 200 feet of slopes steeper than a 2:1 gradient within the leased area.
- h. Within established rights-of-way of canals, laterals, and drainage ditches within the leased area.
- i. Within a minimum of 500 feet horizontal from the centerline of the facility or 50 feet from the outside toe of the canal, lateral, or drain embankment, whichever distance is greater, for irrigation facilities without clearly marked rights-of-way within the leased area.
- j. Providing that appropriate environmental compliance measures can be ensured, and providing further that Reclamation project works and other public interests can be protected, Reclamation may consider, on a case-by-case basis, waiving the requirement specified in Section 2 hereof. **HOWEVER, LESSEES ARE ADVISED THAT OBTAINING SUCH A WAIVER CAN BE A DIFFICULT, TIME CONSUMING, AND COSTLY PROCESS WITH NO GUARANTEE THAT RECLAMATION WILL GRANT THE REQUESTED WAIVER.**

3. No occupancy of the surface or surface drilling will be allowed in the following areas. In addition, no directional drilling will be allowed that would intersect the subsurface zones delineated by a vertical plane in these areas. The following restrictions apply only to mineral tracts located within the boundary of a Bureau of Reclamation project, where the United States owns 100 percent of the fee mineral interest in said tract, or tracts.

- a. Within 1,000 feet of the maximum water surface, as defined in the Standard Operating Procedures (SOP), of any reservoirs and related facilities located within the leased area.
- b. Within 2,000 feet of dam embankments and appurtenance structures such as spillway structures, outlet works, etc.
- c. Within one-half (1/2) mile horizontal from the centerline of any tunnel within the leased area.
- d. Providing that appropriate environmental compliance measures can be ensured, and providing further that Reclamation project works and other public interests can be protected. Reclamation may consider, on a case-by-case basis, waiving the requirements specifies in Section 3 hereof. **HOWEVER, LESSEES ARE ADVISED THAT OBTAINING SUCH A WAIVER CAN BE A DIFFICULT, TIME CONSUMING, AND COSTLY PROCESS WITH NO GUARANTEE THAT RECLAMATION WILL GRANT THE REQUESTED WAIVER.**

4. The distances stated in items 2 and 3 above are intended to be general indicators only. The Bureau of Reclamation reserves the right to revise these distances as needed to protect Bureau of Reclamation facilities.

5. The use of explosives in any manner shall be so controlled that the works and facilities of the United States, its successors and assigns, will in no way be endangered or damaged. In this connection, an explosives use plan shall be submitted to and approved by the Regional Director, Great Plains Region, Bureau of Reclamation, or his/her authorized representative.

6. The lessee shall be liable for all damage to the property of the United States, its successors or assigns, resulting from the exploration, development, or operation of the works contemplated by this lease, and shall further hold the United States, its successors or assigns, and its officers, agents, and employees, harmless from all claims of third parties for injury or damage sustained or in any way resulting from the exercise of the rights and privileges conferred by the lease.

7. The lessee shall be liable for all damages to crops or improvements of any entryman, nonmineral applicant, or patentee, their successors or assigns, caused by or resulting from the drilling or other operations of the lessee, including reimbursement of any entryman or patentee, their successors or assigns, for all construction, operation, and maintenance charges becoming due on any portion of their said lands damaged as a result of the drilling or other operation of the lessee.

8. In addition to any other bond required under the provisions of this lease, the lessee shall provide such bond as the United States may at any time require for damages which may arise under the liability provisions of Section six (6) and seven (7) above.

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